JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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VOL. LXXIX., No. 2018.—TUESDAY, JANUARY 14, 1902.

EDITORIAL NOTES.

An Amateur of Smoke Prevention.

THE current number of the "Nineteenth Century" contains an article on the "Reduction of Town Fogs," by the Hon. Rollo Russell, who appears to have joined the band of would-be smoke preventionists with the usual social reformers' equipment of plenty of good intentions, and lack of all but a slight literary acquaintanceship with the subject-matter. Thus, Mr. Russell reminds his readers very pleasantly of the number of the London population, and shows that making the burning of sea coal in the Metropolitan area a hanging matter did not stop the practice. This record should be a very useful corrective of the notions of those enthusiasts who may be inclined to think too highly of the efficacy of Acts of Parliament directed against the current of public opinion. Mr. Russell thinks that the incessant growth of London has made the prevention or reduction of smoky fogs "a matter of life and death to a large number of its "inhabitants;" and cheerfully remarks that "administrative "regulation," and "some common sense of responsibility," will suffice to secure the desired object. He is sanguine. Of course, he also "weighs in" the old statement as to the desirability for other reasons of checking "the wasteful care-"lessness which throws so big a volume of the raw sewage "of combustion into the air we breathe"—which shows that his knowledge of the engineering and economical aspects of the uses of fuel is imperfect. Certainly, it is all true enough that town air contains a lot of microbes, and bacteria, and dust, and carbonic acid, and other dreadful things which are less plentiful in the atmosphere of Salisbury Plain; but sociability must be paid for in more than one way. Neither is it of the slightest use for a Londoner to sigh after the hard and bright Continental atmosphere of Berlin or Paris. He can, however, console himself with the reflection that the home mixture is healthier. This is, perhaps, the greatest of our modern sanitary reformers' difficulties. London is the healthiest of the large cities of the world; and while the people are well aware of this fact, it will be impossible to create anything like a scare about the deadliness of London fogs.

Mr. Russell writes very nicely indeed about the different varieties of fog which ordinarily afflict the Londoner, and candidly admits that, for reasons which he gives, the City does not now suffer so much from the inconveniently thick ground-level fogs which Dickens has described as common in his day. We get the newer phenomenon of the dark, high fog instead. Where he goes wrong and becomes foggy himself, is in repeating uncritically such empty phrases as that "factories are enabled to consume their smoke, or, "rather, to avoid producing appreciable smoke, by various "ingenious appliances which need not be mentioned." If Mr. Russell was a director of an electric railway, he would give something considerable to anybody who could mention one such appliance, of universal applicability. Also, when he goes on to state that "some factories have already saved "by their use in a few years several thousand pounds," he is only exhibiting himself as an incompetent witness. It was the same lack of knowledge of the facts which cursed with futility the old Smoke Abatement Society started by Dr. Ernest Hart. Why does not Mr. Russell inquire of the frugal German factory-owners of the Westphalian region the reason for the emission of the dense black smoke with which their tall chimneys poison the air near and far?

On the troublesome point of domestic smoky chimneys, Mr. Russell is as vague and amateurish as his predecessors in this line of writing. He thinks gas-stoves are very useful things in their way, "and may even in some cases save "expense, where carefully attended." Not a very warm advocacy, this; but probably fairly enough based on experience of the wasteful habits of domestic servants. He wishes the gas were "made cheaper." It would not be amiss also to breathe an aspiration for servants better trained in its use. But Mr. Russell has his hopes of gas. He remarks that "the very large employment of electricity for lighting pur-"poses ought to have led before now to an important reduc-"tion in the price of gas; for, having cheap oil and electric "light, we could do very well without it." This is an encouraging way to talk about the gas industry! Naturally, Mr. Russell is of opinion that in the future gas will be supplied rather for heating than for lighting; and he thinks this so good for London that "every possible facility should be "given for a cheap domestic supply, and for fixing the neces-"sary appliances at a very low rental." Well, two London Gas Companies are bent upon obtaining statutory facilities next session for lending themselves to such a development; and they will be strongly opposed at the cost of the ratepayers for their temerity. Mr. Russell amiably believes that the municipal ownership of gas-works is advantageous to the realization of the desirable object of the common use of gas for heating and for power. He ought to have inquired whether the facts support this theory of his, before putting it forward as a working hypothesis. "Parliament has given "the gas companies a monopoly of supply; it would cer-"tainly seem to have the right to abolish the monopoly on "very moderate terms of purchase, or to insist on a large "reduction in the price of gas for heating purposes." Perhaps if the writer of these words will take the trouble to follow the proceedings of Parliament in the ensuing session in regard to gas supply, he will be much better equipped for reviewing the subject on a future occasion. It is very good for persons of the stamp of the Hon. Rollo Russell to interest themselves in matters of this kind; but it would be still better if they would condescend to a preparatory study of those practical entities which the prosecuted factory-owner and the much-inspected gas manufacturer have to face—sometimes in company with a Police Magistrate.

The Paris Gas Question in Course of Settlement.

THE vexed question of the future of the gas supply of Paris is actually being put forward for settlement, so far as this can be effected by the Municipal Council. As a lesson of the way they do these things in France, it is interesting to note that the Agent of the National Government, the Prefect of the Seine, who has his seat beside that of the Mayor, although he rarely takes an overt part in the routine proceedings of the Council, convened an extraordinary session of this body to consider and dispose of three urgent matters of first-rate importance—the gas question, the demolition of the fortifications, and the new Metropolitan railway schemes. We do not quite know how far the powers of the Prefect of the Seine extend, in over-riding the resolutions arrived at by the Council, but believe that this official is practically omnipotent, although the iron hand is very carefully and neatly gloved for business purposes. The extraordinary session was to occupy three days, beginning last Thursday; and as the gas question was the first on the *agenda*, we had hoped to be able to announce to-day that something had been done towards its solution. This, however, is not so. The latest news is to the effect that, after occupying all three sessions, the discussion remained unfinished. The Prefect, on being appealed to for his "opinion" on the matter, promised that he would give it, but at such time and under such conditions as he should deem convenient; and in the interim he would engage to prolong the session. He subsequently announced its extension till next Saturday. This is how the principle of Democracy in Government is understood in Republican France!

Meanwhile, the position is, briefly, as follows: The existing Treaty under which the Paris Gas Company live and trade, has barely four more years to run, and it is imperatively necessary that all the vast interests concerned should know what is going to happen then. Under the Treaty, a portion of the Company's property passes over at its termination to the Municipality; and the remainder will be for sale at merely its old-iron value. There will, of course, be no good will or other intangible asset to dispose of. Hereupon a Municipal statesman, M. Chamon, has proposed a scheme which has received the approval of a Special Commission, and is reputed to find favour with Parisians generally. This is for the Municipality to acquire the gas undertaking as a going concern, and lease it to a concessionary, who shall

engage to lower the price of gas to private consumers from 30 c. per cubic metre (about 6s. 9d. per 1000 cubic feet) at which it has remained for 35 years, to the at present popular figure of 20 c. per cubic metre (about 4s. 6d. per 1000 cubic feet). The idea is, that if such an arrangement can be agreed to, the desired reduction in price could be effected as from the beginning of the current year, by virtue of a financial operation which the Municipality, the expectant Concessionary, and the Gas Company might possibly bring off. Naturally, the Gas Company will fall in with anything that does not invade their legal rights.

The difficulty of the position of the Municipal Council is a very simple one, although it is not much talked about. Many members have obtained election to this body on the strength of promising to secure a reduction in the price of gas; but nobody, either before or after election, cares to own that the only hindrance to an immediate reduction is the enormous subsidy paid into the Municipal Treasury by the Company, which amounted last year to the handsome total of £685,000. Of course, they want cheaper gas for the public; but they also want the same subsidy for their own spending. With the national genius for "make-believe," which explains so many of the strange events of French history, the majority of the Paris Municipal Council want to give the public the equivalent of this handsome slice out of the Company's cake, and still have it to eat.

M. Sauton is another member of the Municipal Council who, like M. Chamon, knows the facts, and takes a statesmanlike view of the position. He told his colleagues that the actual cost of making gas in Paris would not be sensibly affected by whatever administrative alteration they might make in the conduct of the undertaking. The selling price must depend chiefly on the capital charges to be imposed upon the works costs. This member favours the solution proposed by M. Chamon and recommended by the Commission. If reason weighs with the majority of the Council, and more especially with the Prefect, this will be the end of the matter. The only criticism one feels disposed to make upon the project is that, as M. Félix Roussel is reported to have said, it appears to bind the future too rigidly to a fixed price of gas, which is wrong in principle. Some device ought to be hit upon whereby the leaseholder should be encouraged to sell the gas at the lowest possible price consistent with the earning of a fair profit on the business.

The Last Tenant's Gas Rent.

One of those little legal intricacies and eccentricities which have an interest for others besides the parties immediately concerned has been under discussion before His Honour Judge Edge, at the Clerkenwell County Court. The facts of the case are very simple, the sum involved small, but the point in question is one of considerable moment to the Gaslight and Coke Company, who supply perhaps more miles of business premises than any other undertaking in the world. In connection with this particular class of supply, the Company possess, in their Act of 1872, a clause which, *prima facie*, gives them a protective right not accorded to an ordinary trader, but which clause, when qualified by previous legislation in the General Gas Acts, appears, according to a decision in the High Court in 1876, and in Judge Edge's view, to be of little real use to the Company. Concisely stated, the facts of the County Court case are these: A Mr. Lowles carried on the business of a grocer, with an off-licence for the sale of wines, spirits, &c. He sold his business to the Cannon Brewery Company, and, with the proceeds of the sale, paid off certain persons who were mortgagees, and to whom he owed money for goods. But he did not discharge his debt to the Gas Company—viz., £10 1s. 3d. This sum the Company now sought to recover from the incoming tenants, under section 18 of their Act of 1872, which section is the one referred to, and is a variation of section 39 of the Metropolis Gas Act of 1860. This last-named section is as follows:—

"In case any consumer leaves the premises where gas was supplied to him without paying to the gas company the rate or meter rent due from him, the gas company shall not require from the next tenant of the premises payment of the arrears so left unpaid unless the incoming tenant agreed with the defaulting consumer to pay the arrears; but the gas company shall, notwithstanding any such arrears, in the absence of collusion between the outgoing and incoming tenant, supply gas to the incoming tenant, as required by this Act, on being required by him so to do."

Now the words of section 18 in the Company's own Act of twelve years later, and on which they relied in this case, are precisely the same as in the first part of the above section until the words "unless the incoming tenant" are reached, when the section is varied by the substitution of the words—

"Shall continue the trade or business of the outgoing tenant, and shall have paid to the owner, lessee, or mortgagee in possession or the outgoing tenant of such premises, a consideration for so doing."

This variation, it will be seen, rejects the preliminary requirement of a covenant for payment of arrears between the defaulting outgoing consumer and the incoming tenant before the Company can call upon the latter for their discharge, and makes the continuation of the business by the incoming tenant, and the payment by him of a consideration for it, the conditions of his liability. Literally, the section attaches to the business the liability for gas arrears, or, to put it another way, makes the business the channel through which the debt is continued on a change of tenancy. As to the equity of such an unusual power as the section appears to confer, opinions will differ; but now is not the time, nor is the "Journal" at present the place, to discuss the point. However, four years after the 1872 Act was passed, the case of *The Gaslight and Coke Company v. Mead* came before Justices Blackburn and Lush. The facts were almost identical with those now under consideration; and there it was held that (quoting from Michael and Will) "an "incoming tenant cannot," under the Company's Acts, "be "summoned for payment of arrears due from preceding "tenants." In the argument of the Cannon Brewery case before Judge Edge the other week, plaintiffs' Counsel did not refer to the Mead case, believing (but his Honour does not) that a subsequent judgment had over-ridden it; while defendants' Counsel did not make use of it for the simple reason that he was not cognizant of its existence, though how it escaped notice—being quoted in the authorities—is curious. His Honour, however, discovered it during the time which he took to consider his judgment; and, in his view, it relieved him of the necessity of giving a decision on the question raised. He therefore pronounced in favour of the defendants, and gave plaintiffs leave to appeal.

Altogether, the case presents points for some pretty legal fencing; and we hope to see them further contested. The fact that the Gaslight Company have raised the question anew looks as though they mean to obtain a final decision upon it. To them, of course, with their considerable trading class of custom, an ultimate decision favourable to the literal interpretation of section 18 of their 1872 Act would, of course, be of very great value. The fairness of their possession of the power is another question, and is open to further consideration and discussion. It may be mentioned that the Company—if we are correctly informed—have exercised the power chiefly in the case of licensed premises changing hands (as such premises do not infrequently) because of their seizure by the mortgagees, who are generally the brewers. Should an incoming tenant find himself required to pay the previous tenant's debt for gas of, say, £20, he might prefer to spend that amount on installing electric light, if by so doing he could avoid payment. But if the Company, besides cutting off the gas, can proceed against, and recover their arrears from, the new man, the latter has no means of escape.

Growth of Electricity Supply in London.

Gas company directors and managers may not be regular readers of the technical journals attached to the industry of electricity supply, as, indeed, is not to be expected even of gas engineers with as much as they can do to keep abreast of the current intelligence of their own speciality. But a man in business who does not know enough of his commercial rivals' affairs to be aware of how matters are going with him, is not fit to be in trade. It is to be feared that some gas directors exist and draw their fees who not realize that they are engaged in trade at all, but have some hazy idea that the shareholders' profits are secured by Act of Parliament. Such persons talk about the possibility, under their Act of Parliament, of raising the price of gas the moment the dividend falls off; but it is high time they were reminded that Parliament does not secure to a gas company any business at all. An awakening on this point is in store for any gas director who will provide himself with the current issue of the "Electrician," and study certain seasonable diagrams therein to be found, which show the extent of the growth of electric lighting in London. There are here also diagrams which illustrate the actual condition of the electric lighting trade in the United Kingdom generally; but there are reasons easy to recognize why the Provincial data are less significant than the London ones. It is impossible for us to reproduce these important summaries in our own

columns, even if it were fair to our contemporary to do so —for we are not given to "lifting" original matter from its proper source, when it is to be had by paying for it.

The equipment of British provincial centres with electricity supply undertakings is not yet sufficiently complete to show the growth of the business distinct from the addition of new plants. It is the more important to remember this qualification, inasmuch as the mass of private enterprise engaged in electricity supply in the United Kingdom outside London is relatively insignificant. By far the greater bulk of the trade in the Provinces is in the hands of local authorities, whose output is fivefold that of companies. In the Metropolitan area, the relative importance of company and municipal working is exactly reversed. What makes the London data of electricity supply connections to the end of last year so striking, and so fraught with meaning for gas administrators, is the fact that they do not illustrate the increase of speculation, but the growth of business. From this point of view, the diagram representing the growth of the Metropolitan and Suburban Electricity Supply Companies is most impressive. The largest of them, the Metropolitan Electric Supply Company, is the biggest concern of the kind in England, and one of the biggest in the whole world, having consumers' connections equivalent to 640,000 incandescent lamps of the standard power of 8 candles. On the diagram, its trace starts up from the commencement of the last decade and soars away without a deflection. Its nearest fellow is the City of London Company; and the Westminster Company is not far behind. There is then a considerable interval before the Charing Cross line distinguishes itself from the others; but the important thing about all these traces is their sharp rise. As our contemporary truly remarks of this phenomenon, the curves show "no "sign of saturation." The growth of electricity supply in London north of the Thames and west of Aldgate continues to be as rapid as it has been any time these twelve years. The undertakings serving other districts of the Metropolitan region are of much later origin, and some of them show slower growth. We are not disposed to moralize on these facts; being more desirous that those whom they concern on the gas side should be acquainted with their existence, and then left to draw their own conclusions from them.

British Workmen and Mr. Livesey.

THE controversy over the working quality of the British workman still goes on in the newspapers, although for the moment it bids fair to be eclipsed in interest for the public by another question, started by Mr. Rudyard Kipling, as to whether the modern devotion of Englishmen to outdoor games is wholly beneficial to the nation. It must occur to many observers of controversies of the kind that they have a fatal tendency to become artificial before they die out. It is agreed on all hands that Mr. Livesey's cure for labour troubles is the only radical one within the sphere of practical politics at the present time; but, of course, there is a wide gap between the perception of this truth and its application. There is a humorous idea extant that man is a rational being. Numerous systems for organizing men in various categories have reposed upon the notion that if menkind can only be assured of the verity of certain principles, they will forthwith proceed to order their affairs accordingly. Nothing could be less in accordance with the teaching of experience. What is the use of logical demonstrations of this or that truth—is not the "conscientious "objector" a personage to be reckoned with, if not respected? Besides, there is the greater number of those who do not object—they have scarcely energy enough for that—but they simply will not move. They find plenty of excuses for sitting still. With reference to the present question, this is what the "Builder" thinks a reasonable comment upon Mr. Livesey's teaching and example, which are both confessed to be admirable: "Mr. Livesey has been very "successful with his Gas Company, and we should be glad "to see him formulate a plan for some other business." Why? Is not this the height of banality? If Mr. Livesey or anybody else were to presume to suggest how a man in another line should order his affairs, he would very quickly be told to mind his own business.

The practical question of questions in labour matters is, how to induce employers to get out of their rut, and tackle the emergency upon their own initiative. Instead of doing this, they appear to be content to allow judgment to go against them by default. Who speaks in the name of the Army? The Commander-in-Chief. And he it is who is expected to think for the rank and file. In the forces of industry, unfortunately, it is rarely the man who pays the wages, or orders the way of the workman, who is recognized as the men's leader and spokesman. Mr. Livesey is losing patience with employers who expect others to fight their battles. He does not recognize an admirer of his labour policy in an employer who makes no attempt at doing likewise, or bettering his example. He would probably be the best-pleased man in England if another employer were to surpass him on his own lines. His grief is that they so rarely attempt to make a fresh move of any kind whatever in the way of improving the lot of the worker. They, in fact, fail before they try.

The Law of Trade Names.

THE subject of trade names is of perennial interest for persons in trade—whether as manufacturers, retailers, or users of goods; and, accordingly, it often creates disputes and litigation. When a speciality offered in the market is protected by a patent, as is usually the case in the beginning of its vogue, it is immaterial how the proprietor names it. He may give it a distinguishing fancy appellation, or call it after himself or his place of business. The patent covers all considerations of this kind, and conserves the owner's right. But when the patent runs out, or supposing that no patent exists, what then? Can a manufacturer establish property in a name of a commodity? Certainly he can, as against anyone who would pirate it with intent to deceive the purchasers into believing that money paid for the article goes into the original sponsor's pocket. A manufacturing engineer may make a particular kind of gas-engine at Rugby, and call it the "Rugby" engine. The style is his property. Nobody else dare make a similar engine at Rugby, and sell it as the "Rugby" engine. But if the kind of engine is so distinctive that after the patent has expired people make them anywhere for sale by this name, recognized by the public as meaning a peculiar type of engine and not the goods of a particular maker, then the original patentee will not be permitted to monopolize the manufacture for ever. The leading example of this in English law is the "linoleum "case," where the article was known by a name expressly coined to distinguish it, which did not prevent the Courts from refusing to restrain persons from making it after the patent had expired.

There will be a question by-and-bye as to the proper significance, and limitation, of the term "Welsbach light." When that time comes, there may possibly be some anxious searchings into the judgments of the Courts with respect to trade names. For the present, it may not be superfluous to remind all and sundry that the term Welsbach gas lighting has not attained the rank of a generalization. The generic term is "incandescent gas" lighting, which is open to the use of anybody and everybody, since it does not imply any particular manufacture. Seeing that the principle of gas lighting by incandescence was known before Welsbach invented his mantle, it may be regarded as doubtful if the use of this cognomen will ever be permissible in the general sense. The United States Courts have just held that the term "Babcock and Wilcox" is not of general signification, but only applicable to boilers made by the Company.

The Gas Exhibition.

The gas exhibition at the Crystal Palace ended its short career on Saturday. Up to a point, as we have said before, it was a success; beyond that point, it was a failure. The extent to which it was a success was in the splendid display made by the majority of the few exhibitors. No matter how vast the exhibition might have been under other circumstances, these exhibitors could not have done more than they did to allure visitors to their stands by making attractive displays. From what we hear, however, the gas profession has not been remarkably prominent at the Palace; and in this regard the result of the enterprise of some of the exhibitors has been disappointing. Certain of them—those dealing with articles of domestic value—have gathered in a fair amount of orders, and the tempting character of the goods exposed to view will be remembered when required by those gas consumers who have had the opportunity of making an inspection during the holiday season.

The Other Side—A Suggestion.

We have said the best that can be said of the exhibition in the preceding paragraph and in the notices we gave

of the exhibits after the opening. Now we have a word to say on the other side of the picture. As a representation of the operations of the gas industry, and as a manifestation to the country of its actuality and its potentiality, the exhibition was a failure. And why? We have searched in vain for some other answer, but the only one we can find is, because it was not conceived and nurtured under the proper auspices. If we are to have an adequate public exposition of what the gas industry really is, then it must have its origin among the representative men of the industry, or in one or both of the chief organizations, and the entire arrangements be confided to a Committee, who would not, we are assured, have any difficulty in getting a ready response from the manufacturers. We have an example before us in the Great International Press and Printing Exhibition which is to be held at the Palace from March 1 to April 12, and have no hesitation in saying, from what we know of the preparations that are being made, that this exhibition will draw press men and printers from all parts of the country, besides offering abundant material which will not fail in inviting the interest of the general public. All the available space on the main floors of the building has been plotted out for the stands. The exhibition is being formed under the patronage of some fifty or more distinguished men. The President of the Council is Sir Sydney H. Waterlow, Bart.; and there are 44 councillors drawn from newspaper proprietors, journalists, printers, and manufacturers, at home and abroad. The General Manager is Mr. Henry Gillman; and the Organizing Commissioner, Mr. W. A. Lawton. Now this is something like a backbone to an exhibition; and if we do not see at the Palace, as the result, a grand demonstration of the progress of the Press and of the graphic arts and printing trade, we shall be much astonished. Now if the Press and printing trades can do this, why not the powerful gas industry? It can if it wills; and what it wills in this respect is bound to have a satisfactory end. The industry will not, in view of the competition of the day, which is constantly growing stronger and keener, do itself any harm in demonstrating what it is, and what it can do. Here is the suggestion; others must follow it up.

Exhibition Awards.

In the preliminary announcements of the late Gas Exhibition, the names of certain gentlemen were mentioned as having consented to act as a Jury, and to make awards to exhibitors. Inquiry was made on the subject on Saturday night; but the stand attendants consulted did not know whether the Jury had performed their work, nor, if they had, to whom awards had been made. But if awards were offered, we venture to think the exhibitors would account them as of small value, seeing that, excepting in the gas-stove department, there was little in the way of competition.

The Gas Undertakings Returns.

The returns relating to the gas undertakings of the United Kingdom for the year ending Dec. 31, 1900, in the case of the Companies, and March 25, 1901, for the Local Authorities, were issued yesterday—nearly a fortnight later than last year. The total number of undertakings included in the returns is 693 (eleven more than last time), with an authorized capital of £117,869,829, of which £102,924,220 has been paid up and borrowed—£71,414,519 by the Companies, and £31,509,701 by the Local Authorities. The total revenue in the entire period covered was £26,760,381; the expenditure, £21,328,501. By the carbonization of 13,906,288 tons of coal, 152,007,811,487 cubic feet of gas were made, of which 140,418,453,827 cubic feet were sold, including 12,108,452,109 cubic feet of water gas and 81,402 cubic feet of acetylene gas. We give the corresponding figures for the year 1899-1900, and leave them to speak for themselves: Coal carbonized, 13,610,688 tons; gas made, 147,155,557,421 cubic feet; gas sold, 135,721,696,079 cubic feet, including 10,077,026,210 cubic feet of water gas, and 75,239 cubic feet of acetylene gas. The consumers have increased from 3,485,557 to 3,713,289; the length of mains, from 26,807 to 27,591 miles; and the public lamps, from 581,206 to 605,156. Other particulars furnished by the returns must be reserved till next week.

The Sulphate of Ammonia Market Last Year.

The course of the market for sulphate of ammonia from year to year is a matter with which gas managers all over the country are closely concerned; and therefore no excuse is needed for devoting a good portion of our space to a notice of the "Review" annually issued by Messrs. Bradbury and Hirsch, of Liverpool. An abstract of the one for the past twelve months, copies of which are probably by this time in the hands of many of our readers, appears in another part of the "JOURNAL." The authors confess that, from the makers' standpoint, last year's business was disappointing. From time to time there was fair prospect of establishing a distinctly higher level in "spot" prices; but the hopes engendered were never satisfied. Messrs. Bradbury and Hirsch estimate the production of ammonia, from all sources in the United Kingdom in 1901, calculated into sulphate, at 220,000 tons, 148,500 tons of which came from gas-works, compared with 142,000 tons in the preceding year. Of the total of 220,000 tons, it is estimated that 146,500 tons were contributed by England, 70,500 tons by Scotland, and 3000 tons by Ireland. The average price last year was £10 11s. 4d. per ton, compared with £11 2s. in 1900. The ups and downs of the market during the past 35 years are strikingly shown by one of the tables in the "Review." In 1867, the average price was £11 10s. per ton; in 1882, it was as high as £20 8s. 6d.; in 1896, as low as £7 18s.; now it is rather below the figure for the first-named year.

Gaslight Workmen's Conspiracy.

Within three weeks of the committal to prison for twelve months of Arthur Thomas Purry, the assistant coke foreman at the Great Cambridge Street station of the Gaslight and Coke Company, Alfred Cole, the coal foreman at the Nine Elms works, has (as our "Legal Intelligence" shows) commenced to suffer a like penalty for similar misdeeds. Probably the man in the East and the man in the West—the one dealing with coke and the other with coal—were quite innocent of each other's fraudulent operations in league with men in relation to whom they occupied an official and responsible position. And yet there is so much sameness between the crafty methods employed, that one cannot clear the mind of the idea that both Purry's and Cole's systems had, at some time or other, one origin—that one is merely a growth from the other. However that may be, in the end they had a connection. It was the revelations at the Great Cambridge Street works that brought about an auditing of the foremen's books at all the other stations, and resulted in the unearthing of the conspiracy at Nine Elms. We believe we are right in saying that a careful examination has only disclosed these two instances of concerted misdemeanour. In their own defence, no matter how painful it may have been, the Company were bound to make a general investigation; and, it having been stated that the fraudulent practices at the eastern works were "a custom" (at any rate) there, the foremen at most of the other stations must have welcomed the accountants' search as the only possible means of wiping out any suspicion which the abuses elsewhere may have raised. It is understood that the workmen who participated in the offences of Purry and Cole have suffered the loss of employment under the Company; and with the committal of the two men named, we hope that a disease of a virulent nature has been completely stamped out, and will never recur. At all events, the fate of those who entered upon this course of wrong-doing, and whose careers have in consequence been—particularly in the case of the two foremen—so early blighted, should act as an impressive caution to others.

The Welsbach Crisis.

By the time the shareholders of the Welsbach Company assemble to-morrow, most of them will have shaken off their belief in one of the precepts venerated in the teaching of youth, and have come to the conclusion that in the multitude of counsellors there is confusion. After the issue of the Directors' reply to, or rather depreciatory comments on, the report of the Advisory Committee, nearly every Editor in the principal towns of the country (the experience of most of whom in incandescent lighting matters has been confined to their own households and offices) tendered advice one way or the other to the shareholders, and many of them opened their columns to correspondence, over which a good deal of ink, paper, energy, and time has been wasted. Among the prominent men who have contributed to the discussion, and who are associated in one position or another with the Welsbach Company, are Mr. Julius Moeller, Lord Alwyne Compton, Mr. A. J. Bethell, and Mr. H. L. Peters. The

time is so near at hand when the whole matter will be submitted to the judgment of the shareholders, that we need not comment to any extent on the various productions. The contribution by Mr. Julius Moeller is rather prolix; and it partakes more of the nature of a defence of personal policy and virtue than anything else. But we are afraid the shareholders will take little account of it, with such a hideous depreciation of their capital as they have staring them in the face, and, as things are now, no dividend in prospect. Lord Alwyne Compton pleads for the acceptance of the Advisory Committee's report, and a reorganization of the Company. Mr. Bethell is the late Director, with whom Sir Henry Burdett alleged, at the last meeting of the Company, the other Directors could not work harmoniously. This whilom Director counsels the rejection of the Advisory Committee's report, and he recommends the same drastic measure in regard to Sir Henry himself. Mr. H. L. Peters, the late Managing-Director, makes it quite clear (quoting from a letter written to him by the Chairman of the Committee, the Hon. Phillip Stanhope) that the Committee are fully conscious of the good work done by him, during his short tenure of office, in the way of producing improved and economical commercial administration. There is talk in some quarters of an effort being made to put Mr. Peters back into his old position; but, if that effort is successful, with Mr. Peters' entrance the present Directors would, we fancy, have to make their exit. The pill would be too big and bitter for them to swallow. The Advisory Committee have refused to enter into any newspaper controversy; they rightly considering (we learn from a letter by Mr. W. W. Wright, their Secretary and Accountant) that the time and the place to justify and maintain their findings are at the meeting of the shareholders. The road which the shareholders ought to take appears to us straight and clear. They appointed a Committee first to investigate, and then to advise. The Committee have done both. If the shareholders had, at the time of the appointment, no intention of accepting their advice, then all we can say is that they sent the Committee on a fool's errand, which is hardly the sort of thing expected and deserved by gentlemen occupying their positions. Only one point more. We learn that, after all, Mr. Head—the Director who a short time since gave notice of retirement—has kindly undertaken not to forsake "the "shareholders" at this juncture; but he "is retaining his "seat on the Board to guard their interests and to emphasize "the harmony which exists among the present Directors, "and as a mark of his confidence in them."

Gas Company v. Stock Exchange.

A question of considerable interest to gas and water companies generally has arisen between the Bristol Gas Company and the Committee of the local Stock Exchange. The trouble, as will be seen elsewhere, arose over a recent sale by auction of capital stock and debenture stock in the Company, in connection with which the Secretary issued a circular to the proprietors offering to make bids (within limits to be named) on behalf of any who might be unable to be personally present. This action was resented by local brokers, who contended that it was usual for intending purchasers who could not attend such sales to instruct their brokers to represent them and bid for stock. The Committee, failing to obtain from the Directors of the Gas Company an assurance that the same course would not be repeated, have taken the Company's stocks out of their official list. The Hon. Secretary of the Exchange has announced, in a letter to the "Financial Times," that this step "is in "general agreement with the feeling of the whole of the mem-"bers of the Exchange, who are naturally unprepared to con-"tinue to advise clients to deal in the stocks of a Company "which seeks to adopt such a course." This is not a very nice confession to make; but we trust the Company will not suffer owing to the disinclination of the local brokers to recommend their stocks as an investment. We shall await with some curiosity the further outcome of the controversy—more especially in view of the fact that the practice complained of in connection with the Bristol Gas Company is adopted by at all events one other company whose stocks are officially quoted on the Bristol Stock Exchange.

An Absurd Contention.

It is difficult to see how the Bristol Stock Exchange Committee can justify the step they have taken—apart from a desire to foster the business of their own members, with which, of course, the Gas Company have no concern. The circular in question was addressed to the proprietors only; and no commission was received by the Secretary in the matter. The plan was adopted purely as a matter of convenience to shareholders living at a distance, to study whom is the bounden duty of the Directors. If the auction room had hitherto been open only to stockbrokers who were commissioned to bid for clients, there might be a shred of reason in the attitude adopted by the Committee; but the sales being public, it is impossible for brokers to claim any special privileges. The Secretary of the Company, whether in his official or in his private capacity, has as much right to attend such sales as anyone else; and we quite fail to see how it can be regarded as "a violation of the spirit of the "Act of Parliament" for him (as Secretary) to openly bid for what the Company are selling, any more than it is for auctioneers to endeavour at their own sales to purchase for absentees such stocks as they may require—and this is a well-known practice. The Committee have acted in the good old trade protection society style; and such methods can never be long successful. While they are fighting to protect their members from what they regard as "unfair "competition," the Company contend for the non-Unionist principle that they shall be allowed to conduct their own affairs in their own way. The shareholders may have to face some slight depreciation in the prices of their stocks, in consequence of their not being so easily marketable; but we hope that this will merely strengthen them in their resolve to resist to the utmost any outside interference with their business.

Manchester Gas Affairs.

Several interesting matters came before the Manchester City Council at their monthly meeting last Wednesday. In the first place, Alderman Gibson, the Chairman of the Gas Committee, has obtained the appointment of a Special Committee to take into consideration the subject of the allocation of the profits of his department. Our readers will remember that the worthy Alderman has views on this question which are not shared by practically the rest of the Council, inasmuch as when, early last year, he enunciated the proposition that the present system of subsidizing the city rate fund out of profits of the gas undertaking is "wrong "in principle, unjust in practice, and inimical to the best "interests of the ratepayers," he only found seven members to support it, whereas eight times this number held up their hands against him. The matter, however, is certainly one for serious investigation. This was acknowledged by Mr. Plummer, the leader of the opposition on the previous occasion, who seconded the motion for the appointment of the Committee. When noticing Alderman Gibson's defeat, we advised him not to despair; and we trust the outcome of the Committee's deliberations will be the conversion of the very large majority of the Council who at present do not see eye to eye with him. Another matter of importance was the decision of the Gas Committee to agree with the suggestions of the City Justices as to the advisability of applying the "double test"—that is, the inclusion of the index—to all gas-meters, the additional fee for which they will pay. Thus a matter which has been much under discussion has at length been satisfactorily settled. The Gas Committee also announced that they had joined the Sulphate of Ammonia Committee. Last, but by no means least in importance, was the decision to extend, on a report presented by Mr. J. G. Newbigging, the Chief Engineer, the high-pressure system of gas lighting in the vicinity of the Technical Schools.

Slovenly Work by a Local Authority.

Horwich, in Lancashire, is not a town on which the eyes of Europe are fixed; yet it occupies a reputable position, and serves its purpose in the world. It is not sufficiently important, however, to have gas-works of its own, and so it obtains its supply from Bolton. This has lately been so unsatisfactory as to give rise to complaints; and on the night of the 28th ult. the town was actually in darkness. The old saying about not missing water till the well is dry is equally applicable to gas. The ready response of the gas-burner to the turning of the tap and the application of the match is so much a matter of every-day occurrence that failure is the more keenly appreciated. No doubt many hard things were said about the Bolton Gas Committee and their Engineer (Mr William Smith) that Saturday night;

and one irate inhabitant has gone so far as to make a claim for compensation for alleged damages sustained. As a matter of fact, however, the cause of all the trouble lay nearer home. According to a report made by Mr. Smith, owing to the "unsatisfactory and untradesmanlike manner" in which a certain drain-pipe had been put in by the Local Authority, water to the depth of 5 inches found its way into a main, while in the surrounding ground it rose to within 3 inches of the top of the gas-pipe. It stands to reason that an adequate supply of gas could not be maintained under such conditions; but the responsibility for their existence must be put upon the guardians of the interests of those who were unfortunately inconvenienced by them.

Municipal Accounts.

Two interesting contributions to the question of municipal accountancy come from the neighbouring boroughs of Plymouth and Devonport. As has recently been shown by its Borough Treasurer, Plymouth is financially in sore straits, principally because of the recklessness with which it has engaged in schemes which seemed to promise great things, but of which it has never troubled to count the cost. One result of this system of conducting the municipal affairs is that the town finds itself more or less committed to enterprises which it has no money to carry to completion. In a report prepared by the Town Clerk, it is pointed out that, in regard to some of these things, the borrowing powers of the Corporation have been not only exhausted, but exceeded; and that, in order to raise money to balance the accounts, it will be necessary to obtain fresh legislation. A more serious matter for the town is that the limit of the Corporation's borrowing powers under the General Sanitary Acts has been practically reached. For such of its schemes as are chargeable on the security of the rates raised under these Acts, Plymouth can obtain no more money, because it has no longer the requisite security to offer. The Town Clerk's advice, therefore, is that the Corporation should make no application for further loans on account of these schemes, one of which is the electric lighting undertaking. Apparently the alternative is to go on owing the money to the bank, which, when the bankers are accommodating and the rate is not too high, affords Corporations an easy method of putting off the day of reckoning. In the long run, the Town Clerk thinks things will right themselves, at least to the extent of enabling the Corporation to convince the Local Government Board that they have some margin of security on which further loans can be advanced.

And Government Auditors.

Devonport's troubles differ from those of Plymouth. In that town there is a minority of the ratepayers who appear to be profoundly distrustful of the wisdom, if not the honesty, of their representatives. For some time past there has been a good deal of criticism of minor items of expenditure, particularly those of a personal character like the expenses of members of the Council when engaged on deputations to other towns or in feasting at home. This agitation culminated last week in a request for the appointment of a Government Auditor of the accounts. The demand was unsuccessful. It was in vain that it was pointed out that the accounts of the new Metropolitan Boroughs are audited by an official appointed by the Local Government Board, and that the accounts of other local bodies throughout the country, including those of a few municipalities, are treated in a similar manner. Nor were the advocates of municipalization to be persuaded that the work of a Government Auditor is superior to that of a private individual, because of his powers of surcharging members who may be responsible for illegal expenditure. When this was suggested, the reply was that the Corporation ought not to sacrifice their freedom, and should not allow a Government official to come there to tell them how to conduct the business of the town. Perhaps when one looks to Plymouth, it is not difficult to understand the bearing of this argument. It is not necessary to believe that members of a Corporation are corrupt because they object to what they regard as Government interference. What they really do not want is the kind of control which would prevent them overrunning their borrowing powers, and would put a check upon such financial juggling as is necessary to enable some municipal schemes to present a respectable front when they come to be submitted to the ratepayers.

WATER AFFAIRS.

The Charge for Trade Water at Bradford.

THE Water Committee of the Bradford Corporation have had imposed upon them, by a resolution passed at the last meeting of the Town Council, a task of considerable difficulty. They are to draw up a scale of charges for water used for trade purposes which will ensure that it is not supplied at "less than cost price." The circumstances under which this matter has been referred to them are these: Consumers of water in quantities of more than 400,000 gallons per quarter pay for the excess at a reduction of 1½d. per 1000 gallons—that is to say, at 7½d. as compared with 9d. According to the Chairman of the Committee, the water costs between 8¼d. and 8½d. per 1000 gallons; and the question has been raised as to the equity of the large consumers, who are wealthy manufacturers, obtaining very considerable quantities of water at less than its prime cost. This subject has cropped up from time to time; and it was brought into great prominence at the last municipal elections. As it has now assumed the proportions of a controversy, it may be of interest to review the conditions which led up to it and those which appear to govern the question now. This we are able to do from an article which recently appeared in a local paper.

It is of the highest importance for a place like Bradford—the chief seat in England of the spinning and weaving industry, in which more than 300 mills are employed—that, after due provision has been made for the ordinary requirements of its 280,000 of population, an adequate supply of water should be available for the use of manufacturers; and the question which is now dividing the burgesses into two antagonistic parties is whether they should be granted any special consideration in the matter of price. It must be acknowledged that the scale for trade water in Bradford does not compare favourably with that in force in other large towns. For example, in Leeds the charge is 6d., Manchester 4·85d., and Glasgow 4d. per 1000 gallons, against Bradford's minimum of 7½d. This figure, however, was not always so high as it is to-day. Many years ago it was as low as 2½d.; then it was raised by 1d. in winter and 2d. in summer, and afterwards by 1d. in each season—making 4½d. and 5½d. In 1887, the minimum was further increased for large quantities to 6½d., at which it remained till June last year, when a dispute took place between the supporters of the trading interest and those who contended that a cost price of 8½d. should be the basis for the calculation of the charges; the result being the settlement of the existing scale, which it is now proposed to revise. Of course, the manufacturers are not all compelled to take the Corporation water. There is nothing to prevent them from boring into the strata below the city, and obtaining a supply from the ample stores to be found therein. But if they did so, they would not gain very much, for the water would be too hard for their purposes, and would have to be submitted to a softening process. It is therefore questionable whether the expense and inconvenience attending these operations would not render the municipal supply preferable, even if charged for at the all-round rate of 9d. per 1000 gallons.

It may be well to inquire here what necessitated the gradual increase in the charge for trade water above alluded to. Mainly the carrying out of extensions of the waterworks necessitated by growth of population and of trade. These, of course, entailed great expenditure of capital, the liquidation of which, and the interest, had to be met by heavy annual payments. For a good many years—probably fourteen or fifteen—the water undertaking was carried on at a continual loss of from £10,000 to £11,000 per annum; and it is only the accounts for the past two financial years that have shown a profit. If the trade rates contributed in any way to the creation of the deficiency in the former period, it cannot be said that they have lately had a very adverse effect upon the finances of the undertaking. The turning in the long lane of its unprofitable working has been reached, and the consumers, as a body, are now paying the entire cost of production, distribution, and management. Moreover, the repayments on sinking fund account which are being made relate to expenditure on works which will be utilizable for a far longer period than will be necessary for the extinction of the present debt upon them. In view of these changed financial conditions, therefore, the recent agitation seems to be scarcely justified. At the same time,

it must be borne in mind that the principal object of a water undertaking is the provision of an ample supply for domestic purposes; and it may be fairly contended that any encouragement given to a lavish consumption of water for trade purposes by putting manufacturers upon favourable terms, is a diversion of this valuable fluid from its primary use, to the possible deprivation of the householder of his legitimate quantity. On the other hand, it appears that there is no ground for fear of any shortage arising owing to periods of drought, and that a few years hence the Corporation will be in possession of so much water that it will run to waste if the demand does not greatly increase. It would therefore seem to be good policy on the part of the Water Committee, while taking care that the ordinary consumers are assured an adequate supply, to encourage a more liberal use of water by manufacturers, and, with this object in view, to charge for it the very lowest figure compatible with the financial well-being of the undertaking. The difference between 7½d. and 9d. is not much, it is true; but the retention of the one or the imposition of the other rate may mean a liberal or an economical use of metered water in the future. It will be for the Committee to say which it is to be. Possibly their investigations may lead to the discovery that, in the existing condition of their undertaking, the lower figure is much nearer the cost price of water than the higher.

The Government Water Bill.

There appears to be good reason for the belief that the Water Bill which is to be introduced by the Government will be one of the earliest measures laid before the House, though its exact terms do not yet appear to have been definitely settled. We learn that the President of the Local Government Board dined last Thursday with Mr. Jocelyn Brandon, who represents Hammersmith on the London County Council, in order to meet the Moderate members of that body and some of the London Unionist Members of Parliament, and discuss with them matters bearing upon this subject. Mr. Long has expressed the hope that his Bill will "hit the happy medium" between divergent opinions. It may also, we trust, prove to be a measure which will do strict justice to the parties whose property is at stake.

The Water Supply of Guernsey.

In our issue for the 31st ult., reference was made to an agitation which has been got up in Guernsey against the Water Company, and to the presentation to the States of a "*requête*," or petition, asking for the appointment of a Committee to report as to whether the Company had not, by failing to furnish a sufficient supply of pure and wholesome water, forfeited the monopoly conferred upon them by their concession, and whether they should not be called upon to relinquish their rights thereunder, and such real and other property as they possess, in favour of the States. The matter came before that body a few days ago, and the proposition of the memorialists was carried by 30 votes to 9. The circumstances of the Company are somewhat peculiar. Owing to want of support from the householders, they have been obliged to apply to the greenhouse proprietors for custom; and the States have never compelled occupiers of houses to purchase water from the Company. The shortage complained of was due solely to drought; and the Company are trying to guard against its effects in future by sinking another well. If the States take over the supply, we fail to see that they will be able to do more, or serve the Island better, than the Company. Instead of having to deal with a Board of Directors doing their best for them, the inhabitants may find themselves in the hands of masters who would make a supply compulsory.

The past and present scholars in the second young men's class at the Providence Congregational School, Middleton, recently asked Mr. Tim. Duxbury, who has taught the class for the last few years, to accept from them a handsome Teacher's Bible, as "a mark of their sincere gratitude to him as a teacher and respect for his character as a man."

We have received "Sugg's Gas Engineer's Pocket Almanac and Lighting Table for 1902," which is got up in the usual style. The leading features of this useful pocket-book are now too well known to call for special indication; but it may be mentioned that the collection of tables is continued, and the gas-testing and other appliances made by the firm are fully described and illustrated.

ESSAYS AND REVIEWS.

GAS BILLS FOR 1902.

(*Continued from p.* 24)

The Barking Gas Bill is to enable the Barking Gas Company to increase their capital by £75,000, to be issued as 7 per cent. ordinary or 6 per cent. preference capital. All the capital is to share equally for dividend up to 7 per cent., after which the holders of original shares are to receive up to 10 per cent. The borrowing powers of the Company are to be increased to one-third of the amount of all issues. The maximum price of gas is to be reduced to 5s. per 1000 cubic feet. As from Jan. 1, 1903, the illuminating power of the gas is to be 15 candles, tested on the works. The usual clause providing for the specification and inspection of consumers' fittings is included. The Company offer to pay 5 per cent. interest upon consumers' deposits.

The Bournemouth Gas and Water Bill is to sanction the purchase by the Company of the Poole Gas and Coke Company, according to the terms of a scheduled agreement to this intent. Fresh capital amounting to £25,000 is required to be raised by the Bournemouth Company for this purpose. The limits of supply are to be altered and extended in accordance with the new arrangement. It is provided that the price of gas in the Poole district shall never be more than 6d., nor for a period of five years from the date of transfer less than 4d., in excess of that ruling for the time being in other parts of the district. The Company desire power to purchase 20 acres of additional lands by agreement.

The Broadstairs Gas Bill is to enable the Company to acquire additional gas lands for the enlargement of their works. The capital is to be increased by £60,000, to be issued as 7 per cent. ordinary and 4 per cent. preference stock, with one-third borrowing powers. It is desired to use pipes for ancillary purposes. The clause for specifying and inspecting consumers' fittings is inserted. The interest payable on consumers' deposits is to be reduced to 4 per cent.

The Bromley Gas Bill is to convert the existing share capital of the Company into new ordinary stocks, whereof the "A" stock will amount to £100,000 and bear a standard 5 per cent. dividend and the "B" stock will amount to £165,700, bearing a 3½ per cent. dividend. Additional capital to the amount of £150,000 is desired, not more than one-half being issuable as preference capital. New issues are to be offered first to consumers and employees of the Company at as near as may be the average market price in the month immediately preceding—provided that in no case shall the reserve be lower than 5 per cent. below such average market price. This average price is to be determined by the records of the London Stock Exchange for the period mentioned. The borrowing powers are to be increased to one-third of the old capital issues and the additional capital, but not, apparently, upon the amount to which the stock is to be nominally expanded by the process of conversion. The standard price of gas prescribed by the Company's Act of 1879 is not to be altered.

The Chigwell, Loughton, and Woodford Gas Bill is to extend the Company's limits of supply to include the parish of Lambourne, in Essex. Power is desired for the laying of a main from the works of the Company to the Woodford Railway Station, for carrying oil or tar. The existing capital is to be consolidated into an equivalent amount of 5 per cent. ordinary stock and 4 per per cent. preference stock. Additional capital to the amount of £100,000 is required. The borrowing powers are to be one-third of the new capital issues. A renewal fund is to be formed, by setting aside 1 per cent. on the paid-up capital, out of the revenue of the Company, and as part of the expenditure on revenue account. The standard price of 4s. 8d. per 1000 cubic feet is proposed for 14-candle gas. The rate of interest payable on consumers' deposits is to be reduced from 5 to 4 per cent. The clause providing for the specification and inspection of consumers' fittings is inserted.

The Commercial Gas Bill is to convert the existing capital of the Company, which consists of £550,000 original 10 per cent. stock, £251,875 additional 7 per cent. stock, and £253,287 debenture stock, bearing 4½ per cent. interest. In 1875, the Company received the sliding-scale, with a standard price of 3s. 9d. per 1000 cubic feet for 16-candle gas. It is proposed to convert the original 10 per cent. stock into £1,375,000 of 4 per cent. stock, and the additional 7 per cent. stock into £503,750 of 3½ per cent. stock. There is unexercised power to issue £28,125 of this stock, which is to be converted into, and be issuable as, £56,250 of 3½ per cent. stock. Rateably with such issue, the Company are to issue such an amount of the remainder of their authorized debenture stock, converted into a 3 per cent. debenture stock, that the nominal amount of the latter should be equal to four-fifths of the nominal amount of 3½ per cent. stock issue. The authorized amount of the insurance fund is to remain unaltered. The Company desire to raise £370,000 of additional capital in the form of 4 per cent. stock, carrying one-third borrowing powers. Fresh issues may be offered at the average market price to consumers or employees. On and after Jan. 1, 1903, the prescribed illuminating power of the gas supplied by the Company is to be 15 candles, and the standard price 3s. 5d. per 1000 cubic feet; and on and after July 1, 1907, the illuminating power is to be reduced to 14 candles, and the

standard price to 3s. 4d. per 1000 cubic feet. In testing the gas, it is to be burnt at such a rate as shall give a light equal to 16 candles. The Company offer to supply gratis new burners suitable for the consumption of the various qualities of gas. Profit-sharing agreements are to be authorized and existing ones are confirmed. The times of holding the ordinary meetings of the Company are to be changed. A schedule relates to the appointment of receivers of stock by the Company's employees.

The Deal and Walmer Gas Bill is to enable the Company to raise £50,000 of additional 5 per cent. capital, of which not more than one-half is to be issued as preference capital. The borrowing powers are to be in the proportion of one-third. The existing capital is to be converted into a uniform 5 per cent. stock. The peculiarity here is that there is a proportion of the old capital which is in 4 per cent. shares; so that the converted amount is to this extent less than the existing figure. Permission is sought for an application for an Electric Lighting Order.

The Fareham Gas Bill is to enable the Company to acquire additional gas lands (including the reclaiming of part of the foreshore of Portsmouth Harbour), to be completed within five years. Additional capital amounting to £30,000 is desired, with one-third loan. The original capital of the Company is entitled to an 8 per cent. dividend. The new issue is to bear a 7 per cent. ordinary, or 5 per cent. preference capital. The sliding-scale is asked for, with a standard price of 4s. 3d. per 1000 cubic feet. It is desired to "manufacture, purchase, supply, hire, sell, let, lay down, place, and maintain gas fittings," &c. Interest at the rate of 5 per cent. is offered on consumers' deposits.

The Leyland and Farington Gas Bill is to enable the Company to consolidate their capital. Under an Act of 1863, the Company were authorized to raise £10,000 as 10 per cent. capital and to borrow £2500. Instead of borrowing this amount, the Company, in the exercise of section 56 of the Companies Clauses Consolidation Act, 1875, raised £1400 by creating and issuing more 10 per cent. shares, and £1000 in 5 per cent. preference capital, with the proviso that if the Company should at any time declare a larger dividend on the ordinary shares than 5 per cent., the preference shares would be entitled to an equal dividend. It is now proposed to convert all the existing ordinary shares into twice the nominal amount of ordinary 5 per cent. stock, and to convert the existing preference shares into a preferential 5 per cent. stock of double the nominal amount. Additional capital to the extent of £40,000 is desired, to be issuable as ordinary or preference stock. The borrowing powers are to be in the proportion of one-fourth.

The Longwood Gas Bill is to enable the Company to acquire the works of the Colne Vale Gas, Drysaltery, and Manufacturing Company, Limited, by agreement made. Additional gas lands are required. The capital of the Company is to be consolidated upon a 5 per cent. basis, and increased by £84,000, which may be sold to employees or consumers without priority. The borrowing powers are to be enlarged to one-third of the nominal amount of the consolidated stock as well as of the new issue. A renewal fund is asked for. The standard price of gas is put at 3s. 2d. per 1000 cubic feet, with the exception of the supply to that part of the township of Lindley-cum-Quarmby, in the county borough of Huddersfield, where it is to be the same as in Huddersfield. The rate of interest payable on consumers' deposits is reduced from 5 to 4 per cent. The clause providing for specification and inspection of consumers' fittings is inserted.

The Reading Gas Bill is for consolidating the capital of the Reading Gas Company upon a 5 per cent. basis, with the addition of £180,000, and one-third loan upon the total amount of the converted capital. Further lands are to be purchased by agreement. Pipes are to be laid for ancillary purposes. Power is asked to refuse to supply trustees in bankruptcy till arrears are paid.

The South Metropolitan Gas Bill is to empower the Company to acquire further lands for the manufacture of gas and the treatment of residuals. The larger portion of the additional gas lands is at East Greenwich, and involves a diversion of Blackwall Lane. As regards the testing of the Company's gas, it is proposed that this should be done on and after Sept. 1, 1902, in accordance with the provisions of the Gas-Works Clauses Act, 1871, and the present Bill. There is to be one testing-place for every gas manufacturing station, not more than two miles away from it, and on a leading gas-main not less than 18 inches in diameter. The sulphur and ammonia tests now in use are to remain as at present. The test for sulphur, however, may be made at any time; and the result is to be evidence of the state of the gas for the day. The maximum of sulphur impurity is to be 22 grains per 100 cubic feet on the average of six days at the same station. The maximum for ammonia is to be 4 grains. The Company offer to compensate the Gas Referees and the Chief Gas Examiner for any loss of emoluments they may suffer under the Bill, at the rate of seven years' purchase of the Company's last annual contribution towards the fees of the said officials. The limitation of time inserted in the Company's Act of 1900 for the conclusion of an agreement with the Gaslight and Coke Company for the severance of the Nine Elms property, is to be removed. The remuneration payable to the Directors is to be increased.

The Swindon United Gas Bill is to enable the New Swindon Gas Company to purchase the undertaking of the Swindon Gas and Coke Company, Limited, when the name of the united undertaking is to be the Swindon United Gas Company. The shareholders in the absorbed concern are to be paid by issues of consolidated ordinary stock in full. The sum of £30,000 additional capital is required, with one-third borrowing powers. The limits of supply are readjusted. Consumers' fittings are to be specified and inspected.

The West Ham Gas Bill is to grant the Company more land. The capital is to be consolidated upon a 5 per cent. basis, with the addition of £600,000, and one-third of the amount as loan. The illuminating power of the gas is to be reduced from 16 to 14 candles.

TRADE IN 1901.

THE publication of the Board of Trade returns for the month of December and for the year thus completed, affords an opportunity for considering the course of business during the past twelve months. Speaking generally, trade was not so good in 1901 as in 1900, which was, of course, the culmination of a period of extraordinary prosperity—a prosperity that brought its own reaction through the enormous increase in the prices of coal and iron.

Looking at our exports of iron and steel, and manufactures therefrom (other than machinery and ships), we find that the volume of trade has receded to the low level from which it began to rise in 1896. Since 1884, there have been only four years in which our exports of iron and steel have been less than they were in 1901. The fluctuations of that branch of trade, and the fact that, even at the height of the recent "boom," the total business done was less than in the previous period of active trade (a proof of the growing competition of other countries), are clearly shown by the following figures:—

Exports of Iron and Steel.

	Tons.		£
1889	4,185,182	..	29,142,129
1890	4,001,430	..	31,565,337
1894	2,649,998	..	18,688,763
1899	3,717,180	..	28,101,049
1900	3,540,689	..	31,992,675
1901	2,900,100	..	25,305,673

It will be seen that, so far as value is concerned, last year (compared particularly with 1894) was exceptionally well favoured. This was due mainly to the high prices maintained for tin plates, to which trade the strike in the United States gave stimulus, and for railway material. The natural result of the falling-off in business done has been a further reduction in prices, which at the end of 1900 had already fallen considerably from the highest point reached during the full rush of work. Pig-iron (No. 3 Foundry, Middlesbrough) was quoted at 68s. per ton at the end of 1899, and at 56s. 6d. at the end of 1900; by the end of the year just passed, the quotation had dropped to 43s. 3d. In regard to manufactured iron and steel, marked bars fell 40s. (to £9) per ton during 1901; common bars, from £10 per ton at the end of 1899 and £8 15s. a year later, dropped to £7 10s.; while steel plates show a reduction from £8 per ton two years ago, and £6 15s. at the end of 1900, to £6 2s. 6d. at the present time. These reductions constitute a welcome relief to those who, like the proprietors of gas undertakings, are considerable users of iron and steel goods.

The imports of iron and steel have not increased greatly since 1900, but were last year considerably in excess of the 1899 figures; the totals being: 1899, 321,819 tons; 1900, 440,621 tons; and 1901, 479,545 tons. The reduction in the demand upon our manufacturers in 1901, as compared with 1899, was therefore: Reduced exports, 817,080 tons + increased imports, 157,726 tons = total, 974,806 tons. This represents a reduction of nearly 3,000,000 tons in the quantity of coal consumed for iron making, without taking into account the reduction in the home consumption of iron, which has been considerable. It is worthy of note that the exports of iron and steel for the month of December last show an increase over 1900 (only, however, 216,694 tons, against 209,157 tons in 1900, and 318,094 tons in 1899). This is the first increase since the middle of 1900, and points to that branch of trade having reached its worst for the present.

As a by no means unreliable indication of the state of trade and employment in this country, the statistics of the consumption of tobacco and cigars may be quoted. In millions of pounds the figures are: 1894, 64·5; 1899, 78·5; 1900, 82·1; and 1901, 80·7. The decline in wages last year was not heavy enough to bring the smoke bill down very much; but the figures respond wonderfully closely to the movement of trade.

The exports of coal, coke, &c., show a total reduction of just about 500,000 tons compared with 1900, but an increase of nearly 2,000,000 tons over 1899. The figures are worth setting out in tabular form.

Exports of Coal and Coke.

	Sold to Foreign Countries. Tons.		Shipped as Bunkers. Tons.		Total. Tons.
1898 ..	36,562,796	..	11,703,903	..	48,266,699
1899 ..	43,111,404	..	12,226,801	..	55,338,205
1900 ..	46,098,228	..	11,752,316	..	57,850,544
1901 ..	43,766,552	..	13,586,833	..	57,353,385

The 46·1 million tons sold in 1900 were valued at £38,620,000; last year's sales of 43·8 million tons at £30,340,000. In 1896, the foreign sales of coal were valued at £15,160,000.

The heavy increase in the shipment of bunkers is not accounted

for by any increase in the volume of shipping entered and cleared with cargoes during the year—the total figures, in millions of tons, being, 1899, 79·2; 1900, 79·9; 1901, 79·7. It would be interesting to know whether the fact that bunkers are exempt from duty has had anything to do with the larger amount of such coal a smaller tonnage of ships has required.

The shipbuilding yards of the United Kingdom launched a record tonnage during last year; but the orders on hand at the end were much less than at the beginning of that period. Inasmuch as the freight market is, has for some months been, and appears likely to remain at present, in a very depressed condition, the shipbuilders will certainly not be so actively employed during the present as in the past year.

Messrs. Bolling and Lowe, the well-known firm of merchants, in their annual review of trade, remark that "protection" is the word "increasingly heard in commercial circles," and obviate the necessity of discussing the arguments for and against a principle that was rejected, with conspicuously successful results, by this country fifty years ago, by adding that "undoubtedly protective duties have the effect of nurturing industries. . . . The worker must be fed. If we cannot give him employment we must support him by a poor-rate; and whether he should get his living by means of 'protected industries' or in the workhouse labour yard, is the burning question. There were on Jan. 1, 1901, more than 800,000 people in England and Wales depending on the poor-rates for their existence." Before publishing such specious arguments in a trade review, Messrs. Bolling and Lowe would have done well to inquire what proportion of the population was dependent on the poor-rates in 1840 to 1845. If employers and manufacturers are going to advocate Protection, while professional politicians advocate Municipalism, and Labour Leaders advocate Socialism, we shall soon have no trade left to review.

AMERICAN v. BRITISH COAL.

The question of whether American coal will be able to compete with British in the European markets in normal times is still the subject of considerable controversy. It is one of very great interest to coal consumers in this country, seeing that, if it be found that British coal has to meet competition in markets hitherto considered to be its exclusive preserve, the knowledge will act as a check upon the raising of prices in our home market when the next "boom" arrives. In this way: Assume a scarcity of coal, both in Great Britain and in France, as there was in 1900. An English colliery has 200,000 tons of coal to sell. In the absence of other supplies, the demand would enable the owner to raise the price perhaps 4s. a ton to the home consumer and to the French alike, and to sell 100,000 tons to each at (say) 11s. f.o.b. But mark the result if the American coal-owner stepped in with an offer to the French consumer of 100,000 tons at a price equal to 8s. a ton f.o.b. Tyne. It would then be more profitable to the English owner to sell the whole 200,000 tons at home at 9s. 6d. a ton than undersell his American competitor in France; and the English consumer would get a more adequate supply at a more reasonable price.

To a very small extent this has already taken place, as is shown by a report, published by the Board of Trade, from Mr. Gurney, H.M. Consul at Marseilles. The imports of American coal into Marseilles rose from practically nothing in 1899 to nearly 120,000 tons in 1900; while it is estimated that the total for 1901 exceeded 200,000 tons. This, of course, is only a small matter compared with our total export of coal to Europe, but doubtless it had a share in the reduction of prices in this country, bearing in mind the fact that a comparatively small margin, one way or the other, between the supply of, and demand for, coal has an altogether disproportionate effect upon prices. The question is: Will the importation of American coal into Europe continue?

Mr. Gurney is of opinion that "this American competition will only become dangerous to British coal if: (1) High prices continue at home; and (2) if the American shipping interest succeeds in securing the passing of the Bounty Bill in 1902. In that case, I fear that the American coalowners will get the hoped-for chance of capturing the Mediterranean coal trade." The first condition is certain not to be fulfilled, for prices in Wales are bound to fall before long, let the miners do what they may; and in the North of England rates are now much lower than they were twelve or fourteen months ago. As to the second condition, it is difficult to form an opinion, and it would be unwise to prophesy before the event. Mr. Gurney, it will be noted, couples the conditions with the word "and." Some other students of the subject would have used the word "or," and would not, we think, have wanted for justification. A bounty of 2s. 6d. per ton on American coal, and a tax of 1s. per ton, or perhaps more, on British coal exports, would together give a considerable initial advantage to the former.

The business done so far by our American friends has not been so profitable as to point to a continuance or a development of their coal exports to Europe, failing the advent of conditions more favourable to them than the present. Referring to the contracts secured by the Americans in consequence of the exorbitant prices of British coal in 1899 and 1900, Mr. Gurney remarks that, in the beginning of 1900, one trial shipment of 15,000 tons took several months to dispose of; and much of it was sold eventually at a considerable loss to the importer. At the close of 1900, under the impression that the rise in price would hold, several further large contracts were made for delivery over 1901 at Marseilles. "Owing, however, to the unexpected fall in prices and freights, these contracts have been deeply regretted. British liners were at the date of this report, taking American small coal at Marseilles; but it was coal on which the importers have lost heavily. The great contracts for American coal made in 1900 have now been worked off, and are not likely to be renewed under present conditions." Prices and freights are at present in favour of British coal.

But the Americans have reaped one advantage from having got a footing in the Mediterranean markets—buyers have become acquainted with American coal, so that, should further opportunities occur for its sale there, the initial prejudice will not stand in the way. American steam coal, we are told, has been tried and found (unlike American gas coal) to be, in quality, far superior to expectation. The old prejudice against it has began to disappear. The difference in firing value between British and competing American qualities, hitherto estimated at 10 per cent. in favour of the British, has already come down to 7 per cent. Americans hope before long to be able to convince their customers in the Mediterranean, by practical experience, that the difference in results is solely due to European ignorance in the handling and firing of their coals. Indeed, they have already succeeded in doing this to an appreciable extent during 1901. The Paris, Lyons, and Mediterranean Railway Company and the Companie Générale Transatlantique find they can burn American small coal without any loss by working it into briquettes. The American coal sold at Marseilles for industrial purposes has also proved quite satisfactory, while anthracites are growing in demand for household use. "The first step has thus been successfully taken," says our Consul. "The question is no longer one of qualities, but of freights and prices," which, as we have said, are at present in favour of British coal.

The plan of the Americans who, provided the Bounty Bill passes, are going to make a grand effort to seize some of our Mediterranean trade, is to reduce costs by owning their land as well as sea transport; to increase the carrying capacity of the steamers; to reduce costs of manipulation by labour-saving machinery; to extend their operations all over the Mediterranean and, *viâ* the Suez Canal, to the East; to pick up return freight at every available port (that is where their greatest difficulty will lie, with a heavy import tariff); and to create huge depôts, and offer a large volume of business. The necessary investigations have, it is said, already been carried out, "with true American foresight and thoroughness, by responsible representatives of leading Companies."

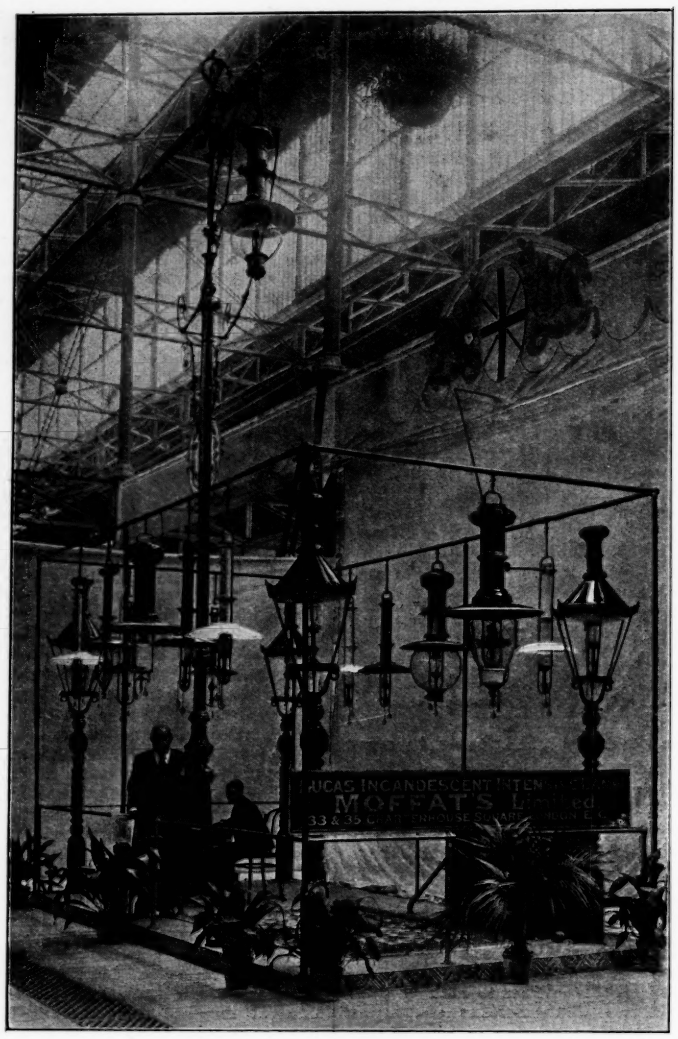
We confess to considerable scepticism as to the practicability of this seizure of the Mediterranean markets by our American friends; though if it is possible they are the people to do it. Certainly, if they are to be kept out of our markets, the miners will have to acquire or be taught wisdom, and not continue the policy of checking output to raise prices. Until, however, the Shipping Bounty Bill has passed, and trade has grown a little quieter in the States, there can be no considerable influx of American coal into Europe.

THE LUCAS "INCANDESCENT INTENSIVE" GAS-LIGHT.

The remarkable demonstration made at the Crystal Palace Gas Exhibition by Moffat's Limited, with the Lucas "Incandescent Intensive" gas-lamp, was without doubt one of the features of the lighting section; and no gas man walked through the range of stands without stopping to make inquiries regarding the lamps which were responsible for the production of the almost overpowering effulgence. The purity of the light, its marvellous intensity, and its absolute steadiness were all qualities which could not fail to go unnoticed. The only criticism one could find to pass on the demonstration was that the number of lamps alight prohibited a judgment on the performance of an independent lamp. But the gas engineer—who is always, and prudently so, inclined to be a bit critical over new means of using the product of his works, and will refuse his support and recommendation until he is satisfied—may now see for himself what a unit of the display made by Moffat's Limited can do in the matter of outdoor lighting. One of the lamps has been fixed near the water-chute in the North Tower Gardens of the Palace; and there it illuminates, even fairly to the boundaries, an area of some three acres in extent. This proves not only a great intensity, but a luxuriant diffusive power. And herein the lamp offers another proof of the great superiority of high-power incandescent gas-lights over electric arcs. The latter have undoubtedly great intensity; but they are just what lamps ought not to be—a brilliant illustration of a selfish centralization of power. The widespread liberality in the matter of light of intensified incandescent gas-lamps will win favour for them, even where the question of cost is not the controlling factor in the choice of lights.

But we have to deal here particularly with the Lucas lamp; and readers will desire to know something as to its construction. There have been some isolated references as to its capability, and as to experience with it in Berlin. But little, so far as we can find, has been published regarding the means by which the lamp achieves its high duty; and, as a matter of fact, there is

little to be told. The lamp asks for no exterior aid; and it possesses no internal mechanism. In truth, it is an exceedingly simple structure; and after examining its constituent parts, one is struck—first, by the fact that there is absolutely nothing that can get out of order save, perhaps, after a few months' use, the wire-gauze cap of the burner and the mantle support, both of which are easily renewed; and, secondly, by the unpretentious arrangement which accomplishes so much. The burner is a plain tube about 7½ inches long, with the gas-injector and large air-admission apertures at the root; above the burner is the globe, again about 7½ inches long; and superposed above the globe is a long metal chimney. The burner, globe, and chimney form a continuous shaft about 39 inches in length, without any inlets for the entrance of air save at the base of the burner, around the gas-injector. In other words, the *whole of the air* supplied to the mantle passes *through the burner* in admixture with the gas. Absolutely tight joints between the burner and globe and the globe and chimney are secured by the employment of asbestos rings, so that there is no opportunity for any air supply, accidental or otherwise, to the exterior of the mantle. The amount of gas which passes into the burner is 17½ cubic feet per hour, and there is nothing in the burner to impede the flow of the gas and air, or any device for effecting their admixture—the ample proportions of the burner tube producing all that is essential in this regard before the point of combustion is reached. With gas pressures above 15-10ths, a simple regulator is used, in order to ensure a proper proportioning of the gas to the air supply; but where the gas pressure is below 15-10ths, no regulator need be employed—the size of nipple used being the only adjustment.



This photograph of Moffat's stand at the late Crystal Palace Gas Exhibition has been taken for illustration purposes, as it shows better than could otherwise be done the various forms in which the lamps are made, and also gives a representation of the method of mast-lighting by the system in Berlin.

Now the whole of the intensifying is produced in this way: Directly the gas and air become heated and volatile, a rapid current is set up by and through the chimney, and this induces a great inflow of air at the base of the burner. The energetic action thus created—the forcible flame exerting all its power on the interior of the mantle, with the exciting rush through the interstices—produces the intense incandescence; the illuminating power, for a consumption of 17½ cubic feet of gas, being stated by the makers to be 700 candles, or 40 candles per cubic foot. A visual test does not suggest a questioning of this statement; and photometrical tests in Berlin corroborate it. Any mantle sufficiently large can be used; but the makers prefer a specially made one of 5 inches in length and 1¼ inches in diameter. Considering the constant powerful rush on the interior of the mantle, it is surprising that it remains so steady and undistorted as it does. But we take it that the force exerted on the mantle would not actually be greater with an induced current or suction action such as obtains here after the lamp has become heated up to its work than in the case of a lamp where the gas is supplied at the high pressure of 8 inches or thereabouts. However, that is a point upon which we cannot speak authoritatively; but anyway as bearing upon it, the makers' experience regarding the use of mantles is interesting. They say they have had mantles last for five months; but, of course, the mantles deteriorate after the first few weeks' burning, so that they always advise renewing the mantles monthly as the same amount of gas is being burnt, and less light obtained. The mantles are of a much stronger fabric than those used in small lamps, and consequently have greater strength.

Some objection may be taken to the lamp on account of its length; but he would be a very captious person who would give appearance precedence over excellence of results—particularly when it is considered that the lamps are only suitable for street lighting, for open spaces, and for large interiors, where the refinement necessary for the drawing-room is not required. The street lamps are made in a variety of styles, with large round or pear-shaped globes and reflecting hoods, or with ordinary lanterns. For interior lighting, no exterior globes are employed, and the lamps are neatly constructed and ornamented. Some are made in black enamel, with brass joints and fittings; others, with pure white enamelled chimneys, opal shades, gilt piping, and brass fittings; and others, again, in black enamel, copper joints and fittings, with ornamental scrolls in copper and black enamel. As at present produced, all the lamps are of 700-candle-power; but as soon as Moffat's Limited commence to manufacture the lamps themselves, they intend to make smaller sizes of lower powers, to suit confined spaces, and positions in which a division of the light would be advantageous. We have said enough to show that in this lamp two extremes meet—simplicity and great illuminating power.

In a recent number of "Zeitschrift für Beleuchtungswesen," particulars were given of some experiments made with the above-named lamp in Berlin. It had been demonstrated by photography that, from the point of view of general effect, the light given by these lamps resembles daylight much more closely than does the electric light, even when a better system is adopted for the suspension of arc lamps than that generally employed. In the Friedrichstrasse, the Lucas incandescent gas lamps are fixed at the great height of only a little less than 7·6 yards above the street level. They are supported on posts (as shown in the illustration) fixed against the edge of the footpath, alternately on each side of the street. The space between any two consecutive posts on the same side is 23·9 yards, on an average. The reason for this light being particularly agreeable is the uniformity with which it strikes different objects. The effect of this is that not only is traffic made easy, but the eye is spared all unpleasant sensation, such as is experienced in passing from an illuminated place to one plunged in darkness owing to its situation between two light centres. Not far from the Friedrichstrasse is the Leipzigerstrasse, where electric arc lamps are employed. This proximity facilitates comparison of the two systems, which is altogether in favour of the former. Moreover, precise photometric experiments have been commenced by Herr Drehschmidt. They were made at a point 6 feet above the level of the street—*i.e.*, at much about the height of the human eye. They not only dealt with the illumination of horizontal surfaces, but also that of the vertical surfaces in two opposite directions. They were made in the middle of the street and also on either side; and the results are given in "Luxes" in the following tables:—

IN THE MIDDLE OF THE STREET.

Friedrichstrasse—Lucas Lamps.

——	Horizontal.	Vertical.	
		Right.	Left.
1.—Against the mast at Mohrenstrasse . .	5·15	3·16	3·44
2.—At a distance of 8 metres	3·44	3·75	4·53
3.—Do. of 16 metres	4·61	3·91	3·16
4.—Do. of 20 metres	4·00	2·74	3·25
Average	4·30	3·39	3·60

Leipzigerstrasse—15-Ampere Arc Lamps.

1.—Under the second lamp in Markgrafenstrasse	15·16	1·25	2·05
2.—At a distance of 11 metres	4·13	5·51	3·18
3.—Do. of 16 metres (midway between two lamps)	2·96	3·47	4·39
4.—Do. of 22 metres	5·02	2·28	6·81
5.—Do. of 33 metres (under the third lamp)	12·32	1·34	1·60
Average	8·06	2·77	3·61

AT THE SIDE OF THE STREET.

Friedrichstrasse—Lucas Lamps.

——	Horizontal.	VERTICAL.	
		Right.	Left.
1.—Against the mast at Mohrenstrasse	7·64	1·29	2·68
2.—At a distance of 8 metres	3·77	5·44	3·02
3.—Do. of 16 metres	2·33	2·85	4·21
4.—Do. of 20 metres	8·21	1·62	1·75
Average	5·49	2·80	2·92

Leipzigerstrasse—15-Ampere Arc Lamps.

1.—Under the second lamp in Markgrafenstrasse	8·27	1 14	2·28
2.—At a distance of 11 metres	3·64	4·96	3·00
3.—Do. of 16 metres (midway between two lamps)	2·37	2·88	3·67
4.—Do. of 22 metres	3·94	2·02	5·08
5.—Do. of 33 metres (under the third lamp)	10·70	1·52	1·64
Average	5·78	2·50	3·13

These figures show very clearly that the lighting of horizontal surfaces from the middle of the street is more intense in Leipzigerstrasse, where the arc lamps are suspended in the centre of the roadway, but that the lighting of Friedrichstrasse is much more uniform. This uniformity is such that the most practised eye is unable to distinguish any patch of shadow or of light. In fact, if we take as a point of comparison the averages 5·49 and 5·78 given in the above tables for these two public thoroughfares, we find the following diversities:—

	Friedrichstrasse. Per Cent.		Leipzigerstrasse. Per Cent.
First observation point	+ 19·8	..	+ 96·8
Second ,, ,,	− 20·0	..	− 48·8
Third ,, ,,	+ 7·2	..	− 63·5
Fourth ,, ,,	− 7·0	..	− 37·7
Fifth ,, ,,	—	..	+ 52·9

The differences are not less conspicuous in regard to vertical surfaces, which even under electric lamps are only very poorly illuminated, as compared with horizontal surfaces. There are no such inconveniences in the Friedrichstrasse.

Leaving the centre of these two streets to investigate matters at the side, we can, by the aid of the figures given above, verify the observations anyone can easily make in these two streets. According to these observations, lighting on the sides is much the same whether horizontal or vertical surfaces are in question. However, the Lucas lamp also gives the advantage of greater uniformity in this case. It must be remarked that the Lucas mode of suspending lamps might be applied to some of the Leipzigerstrasse electric lamps. Experiments could then be repeated; and as the two systems would be the same as regards fittings, results would be much more conclusive. The advantage would, however, certainly remain with the Lucas lamp.

The numerous professional friends of Mr. C. W. Offord, Secretary and General Manager of the Enfield Gas Company, will, we are sure, unite with us in expressing sincere sympathy with him in the sudden bereavement he has sustained by the death of Mrs. Offord, which took place on the 6th inst., from pneumonia, after a short illness. The deceased left five daughters.

Our contemporary the "Globe" has been devoting some space to accounts, extracted from their files, of past coronation ceremonies; and in the course thereof, a reference was made to the attempt to introduce gas, in place of wax candles, for lighting the House of Commons, to celebrate the Coronation of Queen Victoria. The authorities expressed their willingness to spend £1000 on experiments, with gas costing £3 an hour.

Masonic readers of the "JOURNAL" will remember that the only son of the late Bro. F. G. Burfield was entered for election into the Masonic Boys' School last October; and some amount of support was given to his candidature. In view, however, of the fact that at last Friday's meeting of the Court of the Royal Masonic Institution for Boys it was announced that it would only be possible to elect into the school in April next 18 boys out of a list of 49 approved candidates, it is most desirable that all who have votes for any of the Institutions should, as far as possible, reserve them for the Burfield case. Promises at the present time, and voting papers when issued, can be sent on to the Secretary of the Evening Star Lodge (Bro. W. T. Dunn, 47, Fentiman Road, London, S.W.) or to the Offices of the "JOURNAL."

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 105.)

THE cheerful attitude in which the markets opened for the New Year, and which was so gratefully welcomed, has already, in the second week of its existence, shifted its ground. Two chief causes appear to be responsible for this. First, pretty well all the markets are extremely touchy and sensitive; and no sooner is there a bit of a rise than there is more or less of a rush to realize a profit. Consequently, the temptation to snatch what could be made out of the rise of the week before could not be resisted. Second, the Funds were harassed with doubts and fears as to what the Chancellor may propose to do in regard to his next instalment of war expenses; and Consols were sold lest they should go lower, which made them go lower still. Altogether prices have shrunk in every department. In the Money Market, there was a fairly good demand, and rates were firm for short loans, but discount was inclined to rule easier. In the Gas Market, the week opened with little animation; and the leading issues could show a fair array of transactions. But it could not last; and the latter end of the week was quite inactive. Movements in values were naturally limited, both in number and degree. But they were in the upward direction; and the general tendency throughout was firm. In Gaslight issues, there was a fairly good amount of dealing in the ordinary at very level figures; and it closed firm, with a mark equal to the best of the week. In the secured issues, there was a little fiddling with the preference, which was let go at the opening for a low figure, which knocked the quotation down a point. But on Thursday a bargain at top price sent it up again. Some quiet, steady business was done in South Metropolitan, at prices which slowly crept up till they touched 126, with a rise of a point in the quotation. Nothing at all was marked in Commercials, and stock is scarce. In the Suburban and Provincial group, there was the least possible amount of business stirring, and quotations were left standing. Among the Continental Companies, Imperial was quite active and in good demand, closing firm at an advanced quotation. Of the undertakings in the remoter parts of the world, there was nothing to note beyond an improvement in Melbourne 5 per cent. bonds. Business in the Water Companies was of its usual limited character; and changes were very light, being confined to slight variations in Chelsea and East London.

The daily operations were: On the opening day, business was undoubtedly active, and prices were fairly good, though Gaslight preference was put down a point. Tuesday's transactions were about on the same level, and quotations remained unchanged. In Water, Chelsea rose 2½; but East London fell 1. On Wednesday, the bulk of the business done was in Imperial, which rose 1½. South Metropolitan also improved 1. On Thursday, prices continued to harden; but the only actual change was a recovery in Gaslight preference. Business fell quieter on Friday. Melbourne 5 per cents rose 1½; and in Water, the East London 3 per cent. debenture gained 1. Saturday was quiet, firm, and unchanged.

ELECTRIC LIGHTING MEMORANDA.

Electrical Fires and Explosions—Scientific Explanations—Defects of the Solid System of Electric Distribution—Effect of Faults.

THE numerous "alarms and excursions" which have ushered in the New Year in the matter of electric traction and electricity supply, have naturally inspired our electrical contemporaries with a subject for comment, in which the reasonable desire to minimize the element of risk in all electrical engineering struggles against the temptation to curse all such untimely "unpleasantnesses;" for our good friends the electricians know full well that the public, especially the female half thereof, hate things that "go off," and will not have any more dealings with them than can be helped. This feeling is bad for electrical business. Accordingly, the "Electrician" valiantly addresses some sensible editorial observations to the vexatious topic, and, greatly daring, declares that "of all branches of applied science, electrical engineering is the one attended with fewest risks either to its devotees or to the general public." That is at once plucky and prudent. The world respects a man who believes in his trade, and speaks up for it when it appears to lie under a cloud. Those partizans and advocates of a cause, or an interest, who are as bold as lions when circumstances favour their side, but shirk inconvenient occurrences and unfavourable evidence, will never count for anything in a world of rough-and-tumble. Consequently, it rejoices us when the "Electrician" thus delivers itself on the morrow of the Liverpool Overhead Railway accident and of certain street explosions in the City of London.

Electrical engineering is the safest of all branches of applied science, is it? Well—that depends. Liverpool has certainly had a horrible electric tramway accident, and a disturbing electric railway catastrophe. Of course, both can be explained. Here let us pause to remark, parenthetically, that scientific persons have rather a weakness for explanations. It is of a piece with the kind of science that one learns of text-books and in lecture theatres, that things should be "explained." Some people are currently reputed to think it satisfactorily explains a round hole if they call it a circular aperture. They speak of iron "*per se*;" and judge it more distinguished to work out a sum to four places

of decimals from an "assumed coefficient," than to make a direct guess at the required figure. But the man and the woman of the world care little for explanations, and have no use for the kind of science which is bound up with them. It is better for business purposes to avoid such things as appear to require explanation. The latest Liverpool electric traction disaster was directly traceable to a remarkable coincidence of various things susceptible of being beautifully explained; but it ought not to have happened at all.

As regards the street explosions in the City of London, the disheartening consideration about these incidents is their occurrence at this time of day, when the public had practically forgotten that any danger lurks in a street cable-box. There was a time when the cast-iron covers of conduit boxes used not infrequently to "levitate" with disturbing violence of action; and whole lengths of street pavement have been upheaved at inconvenient hours. The natural "explanation" of these phenomena was that gas escaped from the street-mains had somehow found its way into the electric-light culverts, where it took the first opportunity for misbehaving itself. No such cheap and easy explanation is available this time, according to the testimony of the "Electrician," which owns that the accident last Saturday week, in Newgate Street, was not due to coal gas, but "a gas proceeding from the compound employed for the 'solid system.'" This is admitted to be the most interesting and important thing in connection with the mishap. Because the situation it indicates as existing in this and other systems of electric distribution is extremely grave for all concerned.

What can look more stolid and incapable of working any sort of mischief than the so-called "solid" electric light main cable? It is wrapped up and laid in pitch; and there it is apparently calculated to lie until the end of all things. But appearances here are evidently deceptive. The Charing Cross and Strand Company's distributing system has been of a sound description throughout their original West-End district. "For ten years it (the Company) has had an excellent system of ducts, with through ventilation, in miles of streets at the West-End of London, and not a single explosion of the slightest kind has occurred on them." When making their raid into the City, the Company adopted the "solid system," probably as being cheaper for long distances. Unfortunately, the solidity in question is not proof against the besetting mischief of electric cables, which is "faults." When there is a fault, there is local heat, which—as on the occasion in point—may be enough to carbonize the bitumen and make gas to explode at the nearest junction box. The two Companies now lighting the City cannot crow over one another in this regard; for they both had similar mishaps within a few hours. Hereupon the "Electrician" shakes its head on the whole system, which somebody has described as a device for enabling the cable maker to get his money before the cable fails. But there are hundreds of miles of such cables laid, at enormous cost and with great inconvenience to the public, in the streets of English towns. It is not a comforting thought that these may break down at any time, and are almost certain to do so at some time, when for any reason a local fault discovers itself. And when the break-down occurs, it will be fortunate indeed if explosive gas-making is not found attending it.

Artificial Atmosphere.—It is reported that, as the result of experiments extending over some years, M. Joubert, formerly Professor of Chemistry at the Polytechnic School in Paris, has produced an apparatus to replace the atmosphere as far as concerns the necessary breathing to sustain life. It was specially intended for the use of divers, or for those whose occupation requires them to go into places where there are noxious gases. M. Joubert's invention consists chiefly in the manufacture of a substance to which he has given the name "Oxylite." It resembles carbide of calcium, and gives off oxygen. By means of this discovery, in addition to a process of absorption of carbonic acid gas, M. Joubert was able to produce a complete "breathing cycle," which, it is stated, sustained life without the aid of the atmosphere, and without any inconvenience to the subject of the experiment. The patient had an apparatus fixed over his mouth and nose. He inhaled the artificial air by a tube connected to one end, and breathed out the vitiated air into a second tube connected with the other end of the apparatus.

A Smart Piece of Pipe-Laying.—Mr. W. Doig Gibb, Engineer of the Newcastle-on-Tyne Gas Company, has just carried out a smart piece of pipe-laying work. It was found recently that Benton and Forest Hall, two outlying villages about four or five miles distant, were likely to have a very deficient gas supply during the winter in consequence of the partial failure of the long length of old main which served them. It was therefore decided to get a new connection through as soon as possible from the nearest large main. With the Company's own men, 2577 yards of 12-inch cast-iron spigot-and-socket mains, lead-jointed, were laid in 20 working days, including the cutting of the pipe trench, the laying of the new main, coupling at both ends into the old mains, and reinstating the road. The cover of the pipe varies from 2 ft. 3 in. to 5 ft.; for 50 yards a track had to be cut through solid rock; and for nearly all the distance great difficulty was experienced owing to mud and water continually running into the trenches in consequence of bad weather. It should be added that the work was done under the direction of Mr. Lewis, Mr. Gibbs's Outdoor Superintendent.

REINFORCED CONCRETE CONSTRUCTION.

THE development of engineering practice on the side of labour-saving appliances is one of the most interesting of studies. Mechanical engineering was the first in this field with labour-saving machines—indeed, in a sense all power machinery is of this category. One cannot mention the horse power of an engine without implying the consideration that it substitutes, and consequently saves, the equivalent amount of animal labour. It is of the recognition of labour-saving as a point in civil or constructional engineering, however, that we propose to treat in the present article. For it is becoming better recognized every day that, in the design of engineering structures, the question of how they are to be constructed, with special reference to labour conditions, possesses capital importance. This consideration did not enter into the calculations of civil engineers until quite recent times. Where it was a question, for example, of making a gasholder tank, the choice was understood to be determined in favour of one material of construction rather than another by certain considerations of fact and of locality. The idea of regarding the workman as an element in the matter never occurred to the designer. If the selection fell upon a brick tank, for general reasons, the thought that the bricklayers might introduce a disturbing factor into the estimates was never entertained. Where there was brickwork to be done, it was assumed that bricklayers would be forthcoming to do it; and there an end.

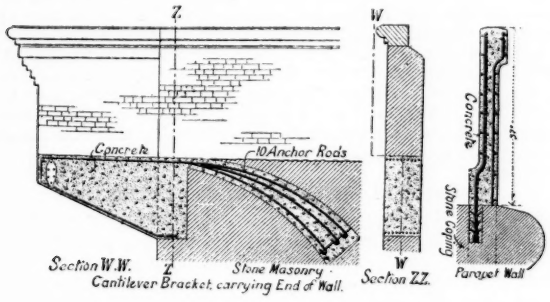
Modern labour developments have changed all that. The unnamed principle underlying the Trade Unions which control handicrafts, is that the work in question is a monopoly of those specialists who are called after it. Consequently, these handicrafts are organized, and the conditions of working are settled, exclusively in the interest of the monopolists. All the controversy that has been going on of late in "The Times" and in other newspapers on the subject of the "Crisis in British Industry," refers really to the alleged over-ruling of all handicrafts in the sole interest of the workman, regardless of everything and everybody else. It is further asserted that the net effect of this "organization of labour," in the Trade Union meaning of the term, is to raise the cost of the work done, by reducing the amount rendered by the men in return for their wages; and also by the irritating and expensive working rules which are insisted upon where a Trade Union is in a position of influence. Brickwork is named as an example in point, it being alleged that there is a conspiracy among Society bricklayers to lay no more than two bricks in the time which formerly sufficed for the laying of three; while there are hard-and-fast lines separating the proper work of the bricklayer from that of the plasterer and the pavior—not to mention other artificial restrictions on the work of brickwork construction. It is clear, that whatever the degree of truth there may be in this impeachment of bricklayers, it constitutes a matter for constructors to take into their calculations in deciding upon the material in which designs shall be carried out. The setting-up of a monopoly on the one hand can usually be countered on the other by dispensing with the subject of it in favour of some equivalent.

This is the origin of labour-saving in constructions, as an engineering exercise distinct from the use in production of labour-saving machines. It is part of this movement that has induced engineers to give a revived attention to the construction of works in masonry, instead of in metal. A few years ago, many structures in and about works—such as viaducts, roofs, and sheds—would have been designed in metal as a matter of course. But there has been a marked change of practice in this regard. For all structures expected to last, masonry—using the word in its widest significance—is being preferred to metal, by reason of the endless cost of preserving and painting the latter. The science of engineering did not for a long time take the painter seriously. The item of painting gasholders and their framing, and roofs exposed to steam and corrosive gases, was treated as a small incidental. Experience has taught engineers to look upon the scraping and painting of structural ironwork as a very grave matter indeed. Economize painters' labour as we may, by the aid of sand-blast cleaning and machine painting, it amounts to a heavy tax upon the value of the structures wherever it is properly attended to; and in places where it is not done, the broken-down aspect of things is depressing in the extreme.

It is becoming a point of sound engineering never to employ exposed metal where masonry can be used as well, with the expenditure of a little ingenuity. In a few years the appearance of many British engineering works will be considerably altered in this way. Of course, when we say masonry, we mean also concrete, including the armoured, or reinforced variety of this material. The engineer cannot afford to fall into the hands of the stonemason or the bricklayer; and as a matter of fact, he is daily getting to be more independent of these highly-skilled, and still more highly-organized, handicrafts-men. In the United States, as well as in France, where members of the building trades are especially to be avoided whenever possible, reinforced concrete is admitted to be the chief modern building material. Recently, the "Engineering Record" published a description, with plans, of a new Court House on Long Island, New York, which is a monolithic steel-concrete building throughout, including the roofs. Foundations, walls, columns, floors, roof, dome, and ceilings are made

entirely of monolithic reinforced concrete, which is continuous, except where shrinkage joints are introduced. If Court Houses can be constructed thus, it is hard to say why retort-houses and works sheds should be more laboriously built.

In the present case, the concrete floor slabs were made of "1:2:3" concrete—one of cement, two of sand, and three of broken stone—with twisted or flat steel rods embedded, according to the strength required. The walls were of 1:2:4 concrete, hollow, with 3-inch slabs outside and 2-inch slabs to form the inside surface, connected across the 15-inch air space by ½-inch rods. The roofs are either hipped or flat, with a shrinkage joint at the ridge. A great recommendation of this method of construction is the facility it affords of reviving the dome as a feature of construction. In this way a retort-house roof might be made positively handsome, as well as perfectly durable and most appropriate to its various purposes. Iron and slate retort-house roofs have surely had their day. It is not the least of the recommendations of a dome (hemispherical) that it is self-supporting from the beginning, and is therefore easily built in reinforced concrete. The Court House here taken for an example contains about 70,000 cubic feet of concrete, and 80,000 lbs. of steel. All the broken stone in the concrete would pass a ¾-inch mesh. It was mixed very wet. The specifications required a sectional area of 1 square inch of steel, and 4 square inches of concrete for every 2000 lbs. of tensile or compressive strain. Speaking of tensile strain reminds one that this kind of stress, hitherto forbidden in sound masonry construction, is quite permissible with reinforced concrete.



An example is supplied by the practice of French engineers in the case of a viaduct on a line between Paris and Versailles, illustrated in the accompanying sections of arches and parapet. It was a question of spreading out the top of the masonry, as shown, over some made-ground; and the connection was effected as indicated. A cantilever bracket was thrown out, actually suspended by anchor bolts. The construction of the parapet is also shown. So bold a cantilever construction is unprecedented. The overhang is 12 ft. 5 in. The parapet wall shown is 37 inches high and 4 inches thick in the middle. It is anchored down every 30 inches by ⅞-inch upright rods let into the stone coping. Horizontal wires run from upright to upright. It is, in fact, a wire fence buried in concrete; and it is expected to last as long as it is wanted.

In constructions of this character, neither the bricklayer nor the stonemason has a hand. The intelligence of the designer takes the place of the handicraftsmanship of the worker, which is as it should be in these times. We have here, of course, merely sketched out principles and indicated possibilities. The method, however, brings to builders of retort-houses and works sheds the same measure of relief that Mr. Livesey found when he constructed his largest gasholder tank of concrete walls, compiled in the simplest fashion by winter stokers and yard hands. Concrete construction has hitherto been regarded as subject to serious limitations of suitability. The truth is that most of these shortcomings are not those of the material, but of the designer. The preparation of concrete slabs and pillars is an art in which the engineering pupil should delight to employ some of his spare moments; and there is plenty of the best material for the exercise in every gas-works. The constructor who can claim to be thoroughly cognizant with the way of building for all purposes in concrete need never go unemployed.

Twenty-nine applications have been received for the post of Gas Manager to the Carlisle Corporation; and a Sub-Committee have been appointed to go through these, and select three or four for submission to an early meeting of the Gas Committee.

Our readers will doubtless remember that Mr. Douglas F. Colson, eldest son of Mr. Alfred Colson, of Leicester, went out to South Africa and served with the Electrical Engineers. He was taken prisoner by the Boers, and an account of his adventures appeared in our columns. While serving at the seat of war, he did so well that he was made a corporal, and when he returned home in November, 1900, he was warmly welcomed. It is interesting to note that the following appeared in the "London Gazette" last week: "Royal Engineers (Volunteers) Electrical Engineers.—Douglas Fairley Colson to be Second Lieutenant. Dated 25th December, 1901." We heartily congratulate him on obtaining his commission, and his father and the family on the possession of such a son and relative.

OBITUARY.

The death occurred, on Thursday last, at his residence, The Larches, Kidderminster, of Sir THOMAS LEA, Chairman of the Kidderminster Gas Company. Deceased's whole life had been bound up with the borough; and his interest in the town was exhibited by large-hearted support of its charitable and public works. The first stages of his illness are attributed to a cold he caught while travelling the previous week.

PERSONAL.

Mr. G. FLOWER WOOD, the Chairman and Secretary of the Downham Market Gas Company, has relinquished this position after occupying it for some years.

The Directors of the Kelso Gas Company have appointed Mr. P. R. CHALMEKS, of Castle Douglas, Manager of their works, in place of Mr. A. C. Young, who goes to Arbroath.

Mr. PLATT, who was the late Mr. John Chadwick's assistant at the Oldham Gas-Works and a recent candidate for the position of Engineer and Manager, has been appointed Manager at the central gas-works.

Mr. A. FORRETT has been appointed Manager and Secretary to the Alfreton Gas Company. Mr. Forrett at present occupies a similar position with the South Normanton, Blackwell, and Hucknall-under-Huthwaite Gas Company.

It has been arranged to leave the headship of the Birkenhead Water Department vacant for the present; and in the meantime the Assistant Water Engineer, Mr. J. W. M. RICHARDSON (son of the former Engineer), has been appointed to have charge of the undertaking. Mr. Richardson has been Assistant Water Engineer for many years, during which time he has actively helped his father in the business.

At a special meeting of the Morecambe Urban District Council in Committee last Tuesday, Mr. J. R. DUFF, the Assistant Engineer and Manager of the Council's gas undertaking, was appointed Manager, in succession to his father, Mr. William Duff, who resigned on the 31st ult. There were originally close upon 60 applicants for the position, and three of them attended before the Council, with the result stated.

The workmen of the Ballymena and Harryville Gas Company, recently waited upon Mr. S. J. ACLAND, the Manager, who is leaving to take up the duties of Manager and Secretary to the Brynmawr and Blaina Gas Company, for the purpose of showing their appreciation of him during the short period of his association with them. Mr. W. Adams (the Assistant-Manager), on behalf of the men, presented Mr. Acland with a massive marble timepiece, bearing a suitable inscription, and expressed their sorrow at parting with him. Mr. Acland thanked the men sincerely for their handsome present, and said he should always remember the excellent staff of men he had been associated with at Ballymena.

NOTES.

The Corrosive Effect of Coke-Breeze Concrete.

A communication has been addressed to the engineering and building journals by Mr. E. Atkinson, the President of the Boston Manufacturers' Mutual Fire Insurance Company, of Boston, which is deserving of general notice. The writer seeks information upon a matter of much importance in connection with the increasing use of concrete in fireproof building construction. He says that many of the kinds of concrete made for this purpose in England, in which coal ashes (or coke breeze) form the agglomerate, are found to be very destructive to the iron or steel used in connection with them. It is, of course, well known that ashes are very bad neighbours for iron pipes or rods in wet ground, which may possibly be attributable to the avidity with which ashes absorb humidity and retain it. The question is, whether armoured concrete made of the same class of materials does or does not cause corrosion of the metal introduced with the object of strengthening it. If it does, there is evidently an end of Monier construction with breeze or clinker concrete. The facts, however, do not appear to be known. Mr. Atkinson asks for information as to the appearance of corrosion in metal forming part of a fireproof construction, from causes other than dampness. This, together with the statement as to the extent to which wire or sheet metal embedded in concrete is depended upon for strength after the cement or concrete has become permanently set, should be worth having. Mr. Atkinson asks his questions in order that arrangements may be made for a really exhaustive study of the subject, and for setting at rest the question of corrosion in connection with the materials of fireproof construction. As a matter of practice, it is probable that where coke-breeze or cinder concrete is used in building construction, no small wires or thin metal work are employed with it. Small, sharp sand with clean gravel or broken ballast are specified for Monier work.

Cooling Flames by Cold Surfaces.

Experimental proof of the validity of F. Siemens's principle as to the inadvisability of exposing flame to the cooling action of solid surfaces is furnished by a report of Herr Schmatoller to a German chemical journal. The writer remarks that the cause

of the smoky burning of bituminous coals in a boiler furnace may be twofold. In the first place, the hydrocarbons decompose at temperatures only moderately high, giving off volumes of finely-divided carbon, which it is not easy to burn. Where there is an insufficiency of air, this separated carbon cannot be expected to burn; but even if there is an excess of oxygen present, it will not burn unless the temperature is sufficiently high. The minimum effective temperature is 1300° Fahr. It is the same with the invisible products of the combustion of coke—they will not burn completely, unless there is not only secondary air enough, but this is hot enough also. The author observed that in a carbonic acid factory, working the coke process, the chimney gases were very unsatisfactory—the proportion of carbonic acid being only from 11 to 12 per cent., instead of 20 per cent., as should have been the case. Moreover, the gases were found to contain considerable quantities of oxygen, besides carbonic oxide, sulphuretted hydrogen, and other combustible gases. Investigation revealed that the products of combustion of the furnace came almost at once into contact with the bottom of a boiler, and were thereby cooled below the combination point. The front part of the boiler bottom was shielded with fire-clay, when the proportion of carbonic acid in the furnace gases at once rose to 18 per cent. In the case of boilers of any kind, this is what is likely to happen, through the unconsumed gases coming into contact with the cold water surfaces, with the result of the production of clouds of smoke, if the fuel used is bituminous. The result can be entirely prevented by keeping the furnace, and the surfaces beyond into which the flame of the fire may penetrate, covered in with fire-clay.

The Phenomena of Combustion of Flaming Fuels.

Mr. W. H. Booth has started a new theory to account for the phenomena of combustion of bituminous coal. Without apparently having heard of F. Siemens's explanation of the principles of complete combustion—that a living flame should never be forced into contact with any solid body colder than itself, if it is to burn itself out to the best advantage—Mr. Booth has arrived at the same conclusion by a different road. He bases himself on the proximate analysis of a bituminous coal, and finds that a good deal of heat must become latent in converting the solid into gaseous hydrocarbons when such a coal is burnt or carbonized. Really, there is no difference between the two processes, regarded from their result in gasifying the coal. Heat is required to effect both; and in the gas-retort setting this comes from the furnace, while in the boiler-fire it has to be borrowed from the coal already ignited. In the latter case, the coal has to be evaporated first before it can be used to evaporate the water to make steam—a double labour. Hence there is a loss of heat in the ordinary boiler furnace not different, either in kind or greatly in amount, to that which happens when coal is gasified in a producer. This is a potent generalization. From it flow many consequential explanations. Why is it, for instance, that coke and anthracite make so hot a fire, locally, and punish the fire-bars as they do? Simply because the local heat is never checked by the abstraction of the proportion necessary for the gasification of the fresh coal. Herr F. Siemens used to make it all perfectly clear by insisting upon the necessity for keeping flames hot so long as there was anything to burn; but the designers of water-tube boilers have gone on the opposite tack, and plunged their cold tubes into those parts of the furnace which Siemens would have left to be heated by radiation only.

Comparing the Power of Fast Running Gas-Engines.

It is generally understood among engineers that the motor-car running on common roads is a valuable test of the performance of internal-combustion engines, as compared with steam-engines. At a recent meeting of the Leeds Association of Engineers, Mr. F. G. Heseldin gave a paper on "Internal Combustion Engines for Motor-Cars," which maintained the thesis that the internal combustion spirit motor has proved itself without a rival for the propulsion of vehicles over long distances at high speeds. In the recent Paris-Berlin race, the highest speed averaged 44 miles per hour—over the total distance of 775 miles; and the weight of the propelling machinery was only 10 lbs. per brake-horse-power. It has often been a curious question as to how the power of these fast-running gas-engines is calculated. It will therefore be instructive to give Mr. Heseldin's rule, which is as follows:

$$\text{B.H.P.} = \frac{D^2 \times (L \times C) \times \left[\frac{(L+C)}{C}^{\frac{1}{3}} - 1\right] \times N}{12{,}000}$$; where

D = diameter of cylinder in inches.
L = stroke in inches.
C = clearance volume when divided by area of piston in square inches.
N = revolutions per minute.

The speed of the gases through the valves is, from the inlet, from 60 to 90 feet per second, according as it is automatic or mechanically operated. That of the exhaust is 75 feet per second. This seems to be about as rapid as gas appliances can be conveniently worked. It is a remarkable circumstance that the small gas-engines of motor cars are the simplest motors of their kind, and rarely give trouble when the prime necessity of lubrication is properly attended to.

The Working of Sand Filters.

A note on the above subject by Mr. H. F. Rutter appears in Part IV. of the "Proceedings" of the Institution of Civil Engineers for the past session. It was at one time believed that the function of the sand in ordinary sand filters was quite a secondary one, and that it was the surface film on which the efficiency of the filter actually depended. In the practical working of open filters, however, the maintenance of this film is impossible. While in mechanical sand filters, the supposed necessity for doing this is entirely ignored. In 1899, the Chief Chemist to the Massachusetts State Board of Health communicated to the author some results which seemed conclusively to prove that the rupture of the surface film has no prejudicial effect on the filtrate. In a filter plant with which the author is connected, great inconvenience was formerly caused in the spring of every year, and sometimes during the summer months, through the rapid clogging of the surface of the sand by the formation of a film which, though of extreme tenuity, was sufficient to entirely prevent the passage of water. Filters which ordinarily continued to work efficiently for two or three months, became useless after five or six days' working. Arrangements were therefore made to break up the film by passing a rake across the face of the filter-bed when in this condition; and after 18 months' experience this has been found to result in greatly increased facility of working, and a material reduction of expense, while the high character of the filtrate has been fully maintained. As soon as a filter shows signs of clogging, the outlet is closed and an interval of about six hours is allowed to elapse to ensure that the whole body of sand below the film is fully charged with water. The film is then disturbed by the rake, and after another resting period of six hours, it is put into use again. It has been frequently observed that a filter which has shown signs of becoming blocked up within five or six days of ordinary cleaning, will work for three or four weeks after raking the surface before it again requires raking. The filters in question can be thus raked two or three times before they require cleaning in the usual manner.

Ozonized Air for Water Purification.

At the recent Sanitary Institute Conference on Water Supply and River Pollution, reference was made to the use of ozonized air for the purification of water. In connection therewith, the details, taken from "Nature," of the experimental plant put up by Siemens and Halske at Martinikenfelde, near Berlin, are of interest. It was erected in 1898, and is adapted for treating 53,000 gallons of water per 24 hours. The ozonizers are of the Siemens and Halske plate and tube type, and yield from 20 to 25 grammes of ozone per electric horse-power-hour, with an electro-motive force of 12,000 volts. The air passing from the ozonizers under these conditions contains from 2½ to 3 grammes of ozone per 220 gallons. An air-pump is used to force the air through the drying chamber into the ozonizers, and it passes thence into the sterilizing tower. This is a simple square structure packed with flints, and as the ozonized air passes upwards, it comes into contact with a descending stream of water. The remainder of the plant at Martinikenfelde consists of a water-pump, a sand filter for the preliminary filtration of the water with which the sterilizing tower is fed, and various storage-tanks for the filtered and the unfiltered water. Tests made with water from the River Spree show that the numbers of bacteriological organisms were reduced from 600,000 to 10 per cubic centimetre. The permanganate absorption figure was reduced 18 per cent.; and the aëration of the water was increased from 10 to 12 per cent. The consumption of ozone amounted to 2 grammes per 220 gallons. The cost of treatment for an installation dealing with 26,400 to 33,000 gallons per hour was estimated to be 1·726 pfennige per 220 gallons; and the total cost, when interest and depreciation charges on the distributing system are included, 5·031 pfennige per 220 gallons (equal to 1s. 5d. per 1000 cubic feet). The capital outlay upon an installation capable of treating 33,000 gallons per hour was estimated to be £6750, of which total £3750 represented the expenditure upon the ozonizers and sterilizing tower. Further details—for those who may be more specially interested in the subject—will be found in an article written by Dr. Erlwein for the "Zeitschrift für Electrochemie" for Nov. 14, last.

The New Patent Office Library.—The new building to contain the library of the Patent Office, which has for some time been in course of erection in Southampton Buildings, Chancery Lane, was opened last week, and it is described and illustrated in the current issue of the "Engineer." The number of books on the shelves of the temporary building in Bishop's Court at the close of last year was 100,000; and they are now arranged in a lofty hall about 140 feet long and 60 feet wide. The floor is 10 feet above the basement; and the distance from the floor to the roof, which is constructed of iron and glass, is nearly 50 feet. On either side of the hall are two galleries, each 19 feet wide, extending the whole length, and joined at the end by narrow passages. They are supported on cast-iron columns, and are reached by iron staircases at each end. From small beginnings, the collection of books and specifications has grown until it has become the most complete scientific library in the country, and readers and searchers have free access to the volumes—a liberty of which full advantage is taken.

TECHNICAL RECORD.

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

The Monthly Meeting of the above Association, held on Saturday last, took the form of a visit to the Rochdale Corporation Gas-Works, on the invitation of the Engineer, Mr. T. Banbury Ball. A large number of the members availed themselves of the opportunity of inspecting the works under Mr. Ball's charge; and the visit throughout proved to be a most interesting and instructive one.

The party was received at the works by Mr. Ball, who was introduced to the members by Mr. Halliwell, the President of the Association. After extending to the members a hearty welcome, Mr. Ball observed that the works were purchased by the Corporation in 1844, for the sum of £26,500; and that this amount represented £167 per £100 of share capital. The output of gas during the first complete year under municipal control—viz., from March 26, 1845, to March 25, 1846, was 27,919,000 cubic feet, which made the capital about £950 per million. The present annual output was just over 500 millions; and the debt upon the undertaking stood at £225,256, or £450 per million. This was not an extravagent sum; but when he said that £331,484 had been paid over in aid of the rates since the property was acquired, it would be obvious that the debt might and ought to have been materially lessened. The present policy of the Local Government Board would in the future accomplish this, as thirty years was now the longest time allowed for repayment of this class of loans. It must be noted that, in the figures given, no account was taken of the cost of public lighting, which was now done, and had been done for many years, without any charge. Most of the present buildings had been erected during the last thirty years, and some of them within the past ten. They consisted of the old retort-house, containing 350 retorts, in settings of seven throughs, 20 in. by 15 in., ⏛ section, and direct fired. There was a small annexe to the above, containing five beds of inclined retorts in settings of sixes, 21 in. by 15 in., ⏛ section, 15 feet long, and generator fired. In addition to these, there was the new retort-house, containing twenty settings of inclined retorts in sixes, 24 in. by 15 in., ⏛ section, 15 feet long, and generator fired. In the old retort-house, there were coal-stores on either side of the settings; but in the new house, where the twenty inclined settings were installed, there was a coal-store on one side only. This was approached by means of a high-level roadway some 30 feet above the general yard level.

The works were some distance from the railway, and the cartage of material to and from them was an important item. They had four Lancashire boilers, 28 ft. by 8 ft. This would appear to be ample provision for the size of the undertaking; but as they quantity of steam was required for the purpose. They had two worked up all their tar and liquor on the premises, a considerable sets of exhausters coupled direct to horizontal engines, each set capable of dealing with 100,000 cubic feet per hour. The condensers were all vertical pipe condensers of the ordinary type. There were two tower scrubbers, each 10 ft. diameter and 40 ft. high, also a "Standard" washer capable of dealing with 3 million cubic feet of gas per day. The purifiers consisted of two sets of six boxes, one set being 24 feet square, and the other 30 feet square; lime being used in the first four in each set, and oxide in the other two. The normal amount of impurities in the crude gas was rather high—1200 to 1300 grains of sulphuretted hydrogen; so that considerable purifying capacity was required. They had two station meters, one of 80,000 and the other of 40,000 cubic feet per hour capacity.

The gasholders were four in number, two two-lift, one three-lift, and one four-lift; the capacities being 434,000, 600,000, 460,000, and 2,200,000 cubic feet respectively—the last mentioned having Cutler's guide-framing, and the others the older type of framework. The total storage capacity was about 3½ million cubic feet, which was rather more than equal to the maximum twenty-four hours' demand. Other departments included the smithy, fitting shop, joiners' shop, store-room, pipe-stores, meter-repairing shops, lamp-rooms, &c.

Some twenty years ago, they commenced the treatment of the residual products, and they had been a source of considerable saving to them, as compared with sending them all the way to Manchester, as they used to do formerly. The members would have an opportunity, in the course of the visit, of seeing the plant for working the tar and liquor. In the tar department, there were three 10-ton stills, with the necessary separators and receptacles for the distillates, as well as the apparatus required for the redistillation of light oils and their separation into benzol solvent, and heavy naphthas, together with the plant for the production of carbolic acid and anthracene. The latter, however, had now become of so little value that they no longer took the trouble to separate it. Their method of enrichment was by the Clark-Maxim process.

The members then proceeded on the tour of inspection, Mr. Ball and Mr. Stenhouse (the Chemist) conducting them through the several departments, and explaining the various points of interest in connection with the plant and general equipment and arrangement of the works. Referring to the inclined retorts in the annexe to the old retort-house, Mr. Ball remarked that they were the first that were put to use in this part of the country. They were put down about ten years ago. Those in the new retort-house were erected about four years later. There had been some discussion lately as to the comparative cost of working horizontal and inclined retorts. He did not want to enter into any controversy; but simply giving his experience with the inclined retorts in the new house, and with horizontals stoked by hand, the cost was as 1s. 7d. for inclineds to 2s. 8d. for horizontals.

The Chairman, before the party left the works, said he was sure the visit had been one of exceptional interest; and what they had learned during the afternoon would be of great value to them as gas students. It was one of the main objects of the Association to extend their knowledge of the various branches of gas manufacture; and, personally, he thought that a visit to works like the one they had inspected that afternoon was one of the best methods of attaining that object.

Mr. Braddock, in proposing a vote of thanks to Mr. Ball for his kind invitation to the works, and to both him and Mr. Stenhouse for conducting the members through the various departments, supported the Chairman's remark as to the value of such visits as a means of securing information on points connected with gas manufacture.

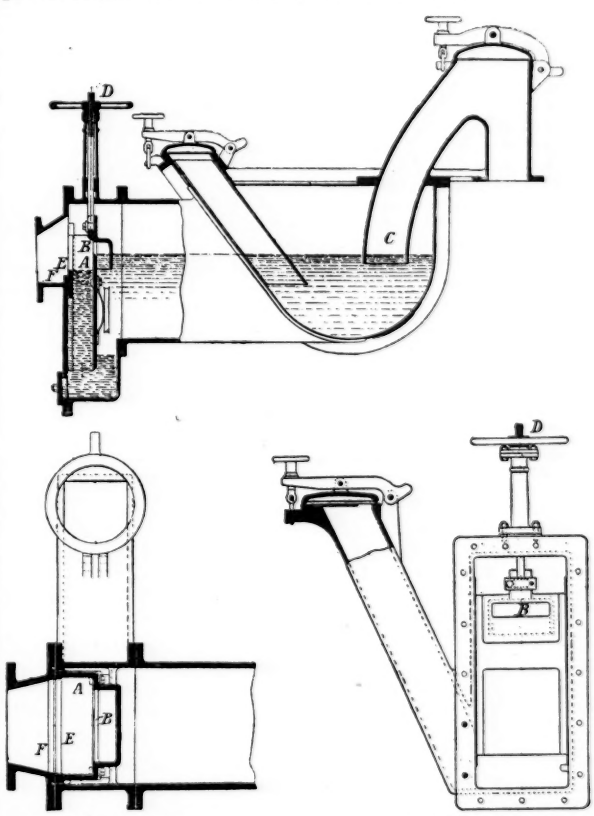
Mr. Garlick seconded the motion, and it was adopted.

Mr. Ball, in responding, said it had afforded him great pleasure to show the members round the works, and he was glad that such a large number had responded to the invitation. By going through works like those at Rochdale, part of which was old and part more modern, one got an idea of the advances made in the science of gas engineering; and the members had been very welcome to see all that they had to show.

Mr. Stenhouse also briefly acknowledged the vote; and the proceedings then closed.

AN IMPROVED DRORY TAR OVERFLOW FOR HYDRAULIC MAINS.

A recent number of the "Journal für Gasbeleuchtung" contains a description of an improvement on the Drory tar offtake for hydraulic mains, which is in general nse on the Continent, and is well known here. We give below an account of the improvement, and of the reasons which called for it.



The Menzel Improvement on the Drory Tar Offtake.

In order that the dip of the dip-pipes, and consequently the pressure in the retorts, may be kept uniform, the hydraulic main is usually provided with special devices for maintaining a constant depth of liquid in it. But as it is further essential that this liquid should consist of as little tar and as much ammoniacal liquor as possible, an arrangement, such as the Drory tar overflow, is used, which carries off the tar before the liquor, and thus

keeps the hydraulic main free from tar. With this arrangement, however, the slide, which is placed after the overflow to regulate the level of the tar, alters only the height of the edge over which the tar flows. Consequently, the dip in the hydraulic main can only be set indirectly in the first place, as the level of the ammoniacal liquor is at the same time raised, owing to its lower specific gravity. Hence the trouble has arisen, when the tar thickens, or its specific gravity changes, of the liquor in the hydraulic main having to stand higher than is desired in order to force the tar away. This involuntary raising of the level of the liquor causes the dip-pipe to dip more deeply in it. As soon as the pressure of the liquor increases sufficiently to force away the tar under the partition, the level of the liquor falls, and the dip again becomes less. Further, the ammoniacal liquor which condenses in the hydraulic main flows away below the partition of the Drory tar offtake. Thus the tar can be forced out from the offtake, so that the level of the liquor in the hydraulic main becomes directly fixed at the height of the tar level slide which comes after the Drory tar offtake.

The Menzel patent tar offtake aims at overcoming these faults of the Drory apparatus. The partition A which is characteristic of the latter, is made, in Menzel's design, adjustable. A slot shaped opening B in the partition constitutes the overflow for the ammoniacal liquor. This overflow determines the depth of the dip of the dip-pipe C, and this may be read off directly on the spindle D. The dip is altered by setting the partition higher or lower. The tar offtake, which continues to be beneath the partition, is regulated by an overflow plate E, which is moved simultaneously with the overflow plate for the ammoniacal liquor. For practical reasons, this overflow plate is not made alterable over its whole range like the overflow plate for the liquor. The tar overflow plate at its lowest position is lower than the edge F on the outlet socket. Consequently the difference in height between the tar overflow and the liquor overflow becomes reduced when E is lowered below F; and hence the tar rises on the side towards the hydraulic main. When fixed at the normal dip of about $\frac{1}{8}$ inch, the difference between the two heights, however, is so great that the level of the tar on the side of the partition A towards the hydraulic main becomes so low that the chamber is still partly filled with liquor; and hence no tar can accumulate in the hydraulic main. The gas passes away above the valve or by a separate outlet.

When thickening of the tar occurs, the liquor cannot rise in order to force it out by greater pressure, as the overflow plate for the liquor is fixed. The level of the tar in the lower part of the tar outflow chamber can, however, rise, without tar passing back into the hydraulic main, until the pressure on the tar seal is so increased that even the thicker tar is forced out below the partition. Should the tar have hardened so much that it cannot be thus removed, it must be cleaned out mechanically, just as must be done in every case of the kind. To facilitate this cleaning, openings with covers are provided at the bottom as well as the front and top. The bottom opening is through an upwardly inclined shoot, with self-sealing lid. Gas is prevented from escaping by the liquor seal, so that cleaning can proceed at any time while work is going on.

The following advantages are claimed to follow the adoption of the adjustable Drory tar offtake: (1) Tar cannot settle in the hydraulic main; (2) the dip can be directly fixed, and read off on the spindle; (3) the actual dip of the dip-pipe always corresponds to that fixed at the outset; (4) the working of the settings is rendered reliable and uniform, and the make of gas is thus considerably increased and the deposition of scurf diminished.

ARSENIC IN COAL AND COKE.

In a recent number of the "Analyst," the above subject was dealt with by Mr. A. C. Chapman in an article of which an abstract appears in the current issue of the "Journal of the Society of Chemical Industry."

The author criticized the existing processes for the estimation of arsenic in coal and coke, and suggested the following method: From 0·5 to 2 grammes of the finely divided fuel is intimately mixed with about 2 grammes of pure calcined magnesia and 0·5 gramme of dry sodium carbonate in a deep platinum or silver crucible. This is placed in a slanting position and heated by a flame which is just capable of keeping the bottom of the crucible at a dull red heat; the contents being stirred from time to time by means of a platinum wire. At the end of an hour, the oxidation will be complete, and 0·5 gramme of pure ammonium nitrate is then added, and the crucible heated more strongly for five minutes. The latter treatment is intended to oxidize any traces of sulphides which may have been formed, and which would tend subsequently to form insoluble arsenious sulphide, and so to remove it from the sphere of action in the Marsh apparatus. The powdery mass is washed into a beaker with dilute sulphuric acid; and the solution is then concentrated so as to decompose any nitrate that may have remained. The solution is submitted to the modified Marsh-Berzelius method, and the "mirror" so obtained compared with the standard.

The following results will show that this method is accurate with larger amounts of arsenic than would ever occur in coal or coke. Weighed quantities of arsenical pyrites of known composition were mixed with coal in which the amount of arsenic present was negligible in comparison with that which was added, and the mixture treated as described above, save that the arsenic was determined gravimetrically as sulphide. The following were the results: Arsenic taken: 0·005, 0·0092, 0·0096, 0·0063 gramme; found, 0·0042, 0·0096, 0·0085, 0·0055 gramme.

In the subjoined table, numbers are given showing the amounts of arsenic present in six samples of coal as well as in the coke made on a large scale from these samples, and in the ash; while the percentages of ash, iron, and calcium are also given:—

Sample of Coal.	Arsenic in Coal.	Arsenic in Coke.	Ash of Coal.	Arsenic in Ash, Calculated on Coal.	Iron in Ash, Calculated on Coal.	Calcium in Ash, Calculated on Coal.	Alkalinity of Ash.
	Grains per Pound.	Grains per Pound.	Per Cent.	Grains per Pound.	Per Cent.	Per Cent.	
1	1·4	1·7	6·4	0·6	2·27	Trace	Distinct
2	0·5	0·7	16·2	0·3	1·71	,,	Slight
3	0·7	1·0	6·7	0·3	2·62	None	Neutral
4	0·7	0·6	2·1	0 6	0·73	,,	,,
5	0·9	1·1	12·5	0·7	1·96	,,	,,
6	0·8	0·6	12·2	0·3	3·50	1·8	Very distinct

There appears to be no definite relation between the amount of arsenic present in the coal and that left in the ash on ignition; the proportion being apparently dependent upon the composition of the ash, as well as upon the manner in which the ignition was performed. The author expressed the opinion that arsenic in coal exists almost entirely as a constituent of the pyrites present.

Index.—The index to Vol. LXXVIII. of the "JOURNAL" is now ready for issue; and Subscribers may have copies on application to the Publisher.

Freemasonry.—At the meeting of the Abbey Lodge, No. 624, at Burton-on-Trent, last Tuesday, Bro. F. L. Ramsden, Engineer and Manager of the gas and electric lighting undertakings of the Corporation, was installed W.M.

The Patent Record in 1901.—We learn from a letter published by Messrs. Stanley, Popplewell, and Co., of Chancery Lane, that the number of patents applied for in this country last year was 26,766, including applications coming from abroad. In 1900 the number was 23,922. The actual number of patents granted is usually about half those applied for, owing to the parties abandoning their applications after provisional protection.

The Largest Gas-Engine in Italy.—The largest gas-engine hitherto employed in Italy has been at work for the last seven weeks at the Central Electric Lighting Works of Pisa. It is an Otto motor of 210-horse power, constructed at the works of MM. Langen and Wolf, of Milan, the introducers of motors of this class into Italy. The following particulars of the motor are taken from "L'Industria." Dimensions, 5·50 m. by 3·50 m.; two parallel cylinders, with a single fly-wheel between them; velocity, 160 revolutions per minute; internal diameter of cylinders, 470 mm. By the aid of the fly-wheel, which is 3·8 metres in diameter and weighs 9 tons, great regularity of speed is attained. The motor is furnished with a very sensitive governor, which ensures a perfectly steady light. The plant demonstrates the growing popularity in Italy of motors working with poor gas.

Sulphur in Fuel.—According to M. Dubois, writing in the "Bulletin de l'Association Belge des Chimistes," superior results to those furnished by the Eschka method for determining the total sulphur in fuel are yielded by the following modification: One gramme of the powdered fuel is intimately mixed with 4 grammes of manganese dioxide, 1 gramme of potassium permanganate, 2 grammes of pure dry sodium carbonate, the whole being placed in a platinum crucible, and covered with a thin layer of the same oxidizing mixture. After heating gently for half-an-hour, the cover is removed, and the crucible heated to dull redness, thus burning off all the combustible matter in the fuel. All the sulphur is transformed into alkali sulphate. After cooling, the contents of the crucible are washed into a glass with from 40 to 50 c.c. of boiling water; the solution is acidified with hydrochloric acid, filtered, and the sulphuric acid in the filtrate is determined by means of barium chloride. The reagents must be free from sulphur, or the content be determined by a blank experiment.

Solubilities of Acetylene and Ethylene.—This subject was recently dealt with by Messrs. S. A. Tucker and H. R. Moody in the "Journal of the American Chemical Society." In order to devise a convenient method for separating acetylene and ethylene, the authors examined the solubilities of the two gases in various solvents. Ammoniacal cuprous chloride solution, which is generally supposed not to have any solvent action on ethylene, is found to dissolve this gas very readily, both in the pure state and when mixed with acetylene. Nordhausen sulphuric acid also absorbs both the gases. Ammoniacal silver chloride, however, only dissolves ethylene to a slight extent; 26 c.c. of the gas, when treated with excess of the reagent, diminishing by 0·2 c.c. For the exact determination of acetylene and ethylene in a mixture of the two gases, recourse must be had to absorption by ammoniacal cuprous chloride, with which acetylene forms an insoluble red precipitate of the composition $(Cu_2C_2H)_2O$. This is collected, washed, dissolved in hydrochloric acid, converted into sulphate, and the copper determined electrolytically.

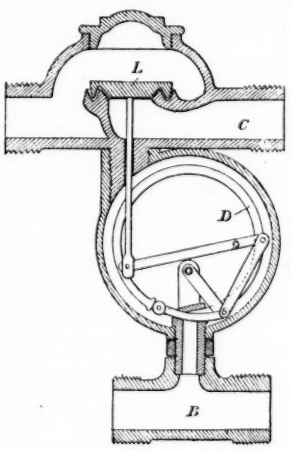
REGISTER OF PATENTS.

Lighting and Extinguishing Gas-Jets.—Lloyd-Wise, W.; a communication from the Aktien-Gesellschaft fur automatische Zund-und Loschapparate, of Zurich, Switzerland. No. 22,601; Dec. 11, 1900.

This arrangement for automatically lighting and extinguishing illuminating apparatus at definite times, consists of a closing device for the combustible supply-pipe operated by a part of a clock movement for the purpose of igniting or extinguishing the jets, whereupon the part of the clock movement can be disconnected. Disengagement is effected by a releasing arm provided with a moveable pawl adapted to be adjusted within certain limits, and tappets rotating with the arbor of the hour wheel of the clock movement. When the tappets strike against the pawl, they move it a short distance idly before they raise the releasing arm; and when the pawl leaves any of the tappets, it returns through the distance it was moved idly, and falls back behind the slowly rotating tappet, and not upon it. [The arrangement referred to formed the subject of a paper read before the Gas Section of the Engineering Congress at Glasgow last September. Herr A. Rothenbach's paper appeared, with similar illustrations to those accompanying the patent specification, in the "JOURNAL" for Sept. 24, 1901.]

Controlling the Supply of Gas to Bath-Heaters, &c.—Roovers, L., of Liège, Belgium. No. 1692; Jan. 24, 1901.

The patentee's object is to construct apparatus intended to control the supply of gas to the fire of a bath-heater, geyser, or similar apparatus, in such a manner that the gas will only be admitted to the burner while the water-supply pipe is open, so as to prevent the flame from the fire injuring the apparatus when the latter is not being supplied with water. As indicated by the engraving, the regulator consists of a Bourdon tube D, one end of which communicates with the water-supply pipe B; while the other (closed) end is connected, by a set of jointed levers working on pivots, to the lower end of the rod of a valve which regulates the admission of gas to the apparatus through the pipe C. In this way, when the Bourdon tube is straightened by the flow of water in the apparatus, it determines the opening of the gas-admission valve.

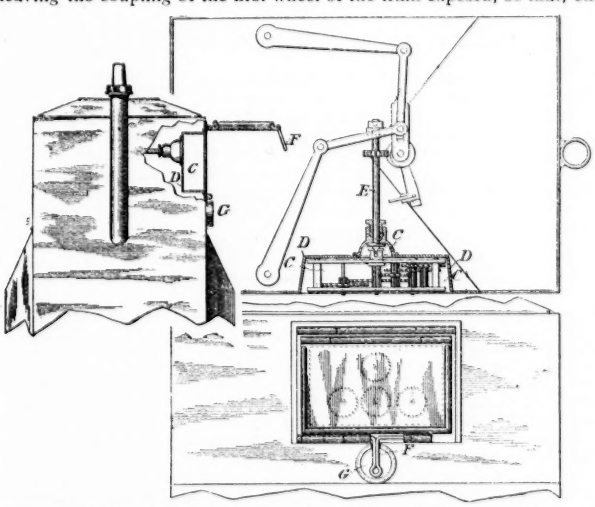


Dry Gas-Meters.—Glover, R. T., of Clerkenwell, E.C. No. 2192; Jan. 31, 1901.

The patentee proposes to construct the index as affixable to the meter, so as to be capable of easy removal for testing purposes without opening the meter.

The illustrations show a side elevation of a meter, with a part broken away to show the interior with the index mechanism removed; a plan of the meter with the top removed and the invention (forming part of the meter casing) applied; and a face view of the index casing portion of the meter.

The whole of the index and indicating mechanism is made as one, with separate apparatus for enclosing same in a casing in the meter—leaving the coupling of the first wheel of the train exposed, so that, on



fixing the indicating apparatus to the meter proper, the coupling will engage the spindle of the meter mechanism, so that the motion of the meter mechanism due to the action of the bellows will be communcated to the index mechanism for registering purposes as usual.

The upper part of the meter casing has a recess C, or is partitioned off from the meter mechanism, by a casing D, except that provision is made for the spindle E communicating with the crank worm to be exposed for connection with the index apparatus; the recessing or partitioning being constructed to suit the shape of the index mechanism. In this partition or recess, the detachable or removable index is fitted, so that it is in gear with the meter mechanism, and is locked to the meter by (say) a hasp F secured at G by a seal.

Heat Interchanger for Use in Connection with Gas-Producers.—Crossley, W. J., of Openshaw, Manchester, and Atkinson, J., of Marple. No. 2225; Feb. 1, 1901.

This tubular heat interchanger is intended for use in connection with gas-producers, for the purpose of utilizing some of the heat of the gases coming from the producer to heat the air, or air and vapour, before passing it into the producer—thus "effecting an economy in the production of the gas, and improving its quality."

The apparatus consists of an external cylindrical shell, placed vertically. At the upper end, there is a chamber for the hot gases from the producer, having a cover on the top, and a tube plate at the bottom. A number of tubes (expanded or screwed into this upper tube-plate) extend downwards to a lower tube,plate, into which they are expanded or otherwise fixed. Extending downwards from the outside of the lower tube plate is a short inner cylindrical shell; and it, as well as the lower end of the outer shell, is inserted into an annular space filled with water to form a water lute, and prevent an escape of either air or gas.

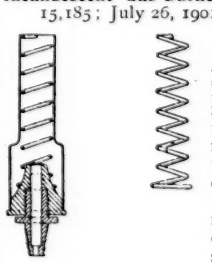
This method of construction, the patentees remark, makes provision for free contraction and expansion of the tubes, tube-plates, and outer shell—a matter of considerable importance when the temperature of the gases is considered. It also makes it easy to examine, clean, and keep in proper working condition, and reduces the cost of construction.

Gas-Heating Appliances.—Harvey, E. C., of Mark Lane, E.C., No. 3341; Feb. 15, 1901.

This invention relates to improvements on patent No. 18,933 of 1900, which consisted of a cap or sleeve adapted to removably fit upon any ordinary gas burner or nipple, and constitute in connection therewith a bunsen burner—the cap or sleeve carrying a skeleton tray, basket, or cage filled with asbestos or the like in a filamentous condition adapted to be heated and rendered more or less incandescent by the bunsen flame. It is found in practice, however, that, when employing asbestos in a broken condition, it is liable to settle too closely around the gas-jets, with the result that they are more or less choked or obstructed, so that the full benefit is not obtained, and an unpleasant smell is created.

To remedy these defects, a skeleton or openwork dome or arch is formed of copper or other wire—preferably covered with a protective coating of refractory material, so as to withstand the heat of the bunsen flames. It would be formed entirely of refractory material; being constructed to spring from the openwork basket as a support, or be carried by the burner or in other suitable manner, so that the material to be heated will be supported above the burner and a clear space left for the proper formation of the flames or jets.

Incandescent Gas-Burners.—Ehmann, C. P., of Manchester. No. 15,185; July 26, 1901.



As shown, this burner consists of a hollow base block connected internally with the gas-pipe surrounded by a mixing-tube having lateral openings for the admission of air. The invention consists in combining with the mixing-burner a coil of wire (shown separately) placed in the interior of the mixing-tube. The patentee states that he finds that "a coil of copper wire, of about the proportional thickness and shape shown, gives the best results, and considerably enhances the efficiency of the burner as compared with a similar burner without such an internal coil."

Coin-Freed Mechanism for Gas-Meters.—Beale, B. R., of Lime Street, E.C., and Bagnall, A. E., of Leadenhall Street, E.C. No. 8820; April 29, 1901.

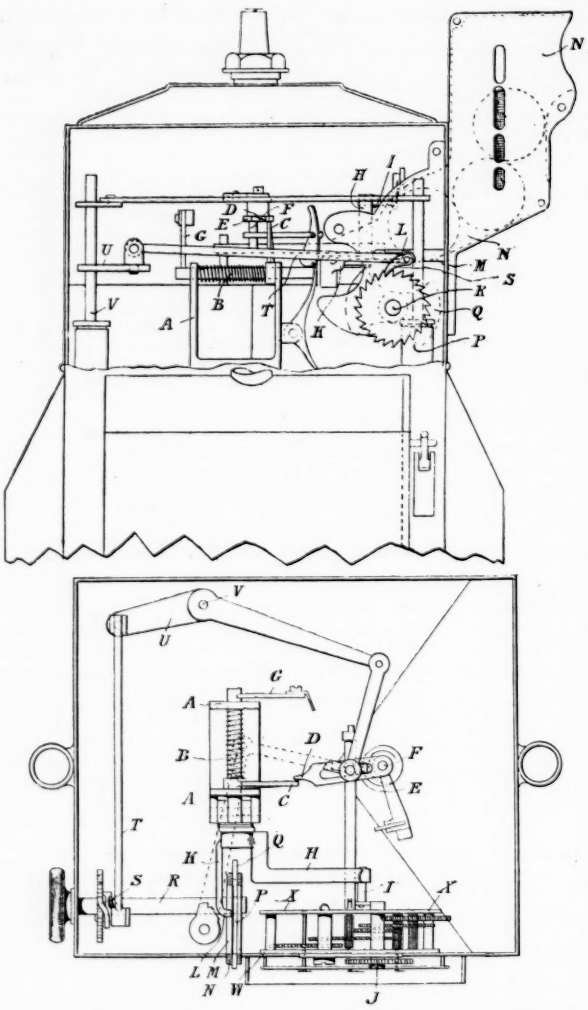
The object of this invention is to allow any number of coins up to a certain quantity being inserted into the apparatus for action automatically and consecutively during the working of the meter mechanism; and by changing a wheel, the number of feet of gas to be delivered for a pre-determined coin can be altered to suit the current price of gas. The mechanism is fitted in the top of the meter without material alteration; and the valves of the meter are shut off by the coin-freed mechanism when the desired quantity of gas has been delivered, instead of by a separate or stop-valve as is now the case.

To a standard A (p. 94) in the upper part of the casing, is pivoted a rod or axle B, carrying four arms—one arm G having a lipped piece at its end for abutment of an extension D of the crank E of the usual valves and index—operating the spindle F when the crank is in a certain position; another arm C also forming a stop for the crank extension D when in another position (as hereafter described); the third arm H acting by a crank-pin I on a price-changer wheel J; the remaining arm K being bent for its nose L to enter a slot M of the coin-shoot N, to hold back the coins contained in it until after the first inserted coin has operated the axle B with its arms, and the rod or axle B is moved over by the crank-pin I actuating the curved arm H through the motion of the meter mechanism. The nose L will then be removed from the slot M, and the coin will fall for the lowermost one to enter the pocket P of a disc Q on a revolving axle R—this being moved by the claw S of a rod T attached to an arm U of one of the flag wires V of the meter mechanism, to again actuate the coin-freed mechanism for automatically continuing the supply of gas.

The front and back framing W and X of the index mechanism are provided with slots for carrying a sleeve Y, which (in turn) carries the axle Z on which the crank-pin I and the price-changer wheel J are situate. The sleeves have a free movement in the slot to suit the size of the price-changer wheel employed; but by a slotted arm or plate

attached to it, the sleeve is securely fixed in the adjusted position by a screw. The front of the door—not shown—of the index mechanism is padlocked or sealed to the meter casing; so that, when a different price-changer wheel J is required to be inserted, all that is necessary is to unlock and remove, or open, the door, loosen the screw securing the plate and sleeve, remove the index-wheel J, and affix and adjust a new price changer wheel J, tighten the plate by its screw, and refasten the door or front.

The action is as follows: The axle B is first actuated by the crank-pin I of the price-changer axle Z, the lipped piece of the arm G raised, and the crank extension D of the meter valve operating the spindle F abutting against same—one of the valves being closed, and the meter mechanism and supply of gas stopped. Now, supposing the predetermined number of coins are inserted in the shoot N, the lower one finding a resting place in a pocket P of the revolving cradle or disc Q, so that on the operation of the handle, the disc Q will be revolved and the coin carried round until it abuts against the end of the pivoted rod or axle B, which is moved end-on by the coin. This action releases the curved arm H from the crank-pin I of the price-changer axle Z. The lipped and curved arms C and H, and another arm G, being freed, drop clear of the crank-extension D, and place the bent nose L of the other arm K into the slot M of the coin-shoot N to hold back the remaining coins. The continued circular motion of the coin will cause



it to drop from the pocket and be discharged into a till or receptacle; but should the handle not be operated sufficiently to free the coin, the crank extension D of the meter valve-operating spindle F will come into contact with the arm C, stop the meter mechanism, and close the other valve until the handle is moved far enough for the coin to be discharged.

The axle B and the arms now return to their normal position—the curved arm H being under, or on the opposite side of, the crank-pin I of the price-changer axle Z; so that the movement of the operating spindle F will, by its worm and index-operating gear, revolve the price-changer gear. The motion continues until the crank-pin I of the price-changer axle reaches the other side of the curved lever, which, with the lipped and other levers C and G on the axle B, it lifts, to place them in position to stop the meter mechanism by reason of the lip of the arm G coming into the path of the spindle-crank extension D. At the same time, the nose of the lever K is removed from the slot M in the coin-shoot N, to allow of the following coin dropping into the cradle of the disc.

During the movements of the bellows, the crank U of the flag-wire V has been revolving the disc Q by means of the claw S of its connecting rod T engaging the ratchet-wheel I, situate on the disc's axle. This is, however, to no purpose, as the coins have been held back by the nose of the lever K. But just before the lip of the arm G has reached its stopping position, the nose L is removed from the slot in the coin-shoot, which allows the next coin to drop into the pocket P of the disc Q, which is revolved by the crank U of the flag wire. The coin then forms a connection; and the rod or axle carrying the arms is moved end-on, the coin discharged, the arms fall, and the curved arm H goes back into position at the other side of the crank-pin of the price-changer axle. The meter mechanism continues its motion, operating the coin-freed mechanism in the same manner until all the coins in the shoot are discharged. When the last coin has gone, the axle and its arms will not be released after being placed in the stopping position; and, consequently, the meter mechanism will be stopped, as before explained, until the insertion of a fresh coin and the operation of the disc by the handle.

Production of Combustible Gas.—Radcliffe, J., of Wrexham. No. 21,376; Oct. 24, 1901.

This invention (referring to the manufacture of combustible gas from solid combustible material) is particularly applicable for the utilization of combustible material that yields a large quantity of ash—such as coal of inferior quality, or town's refuse, or a mixture of town's refuse and coal, or peat or shale.

The combustible material is fed to the upper end of an inclined revolving chamber, so as to close it. It is caused to slowly descend, while being continually turned over or agitated by the revolving motion of the chamber, so as to expose ever fresh surfaces for combustion. Air, or a mixture of air and steam, is simultaneously caused to enter the lower end of the revolving chamber, produce combustion of the fuel in the lower portion, and raise the upper portion of the mass of fuel closing the upper end of the rotary chamber to a state of incandescence. The products of combustion from the lower portion of the chamber are caused to pass through the upper mass of incandescent fuel, so as to become converted into combustible gas, which flows away, and the resulting ash is simultaneously passed over a stationary ash bridge and into a normally sealed outlet passage.

APPLICATIONS FOR LETTERS PATENT.

26,103.—Lancaster, W. T., "Inclined retorts of gas-producers." Dec. 21.

26,165.—Murray, T. R., "Pumps for compressing gases." Dec. 21.

26,198.—Keith, J. and G., "High-pressure burners." Dec. 23.

26,242.—Heering, F. J., "Incandescent gas mantles." Dec. 23.

26,252.—Trendel, F., "Bath gas-stoves." Dec. 23.

26,324.—Kitson, A., "Vapour-burning apparatus." Dec. 24.

26,330.—Mills, B. J. B., "Generating producer gas." A communication from J. R. Taylor. Dec. 24.

26,372.—Johnson, T. A., "Gas producers." Dec. 24.

26,396.—Feld, W., "Recovery of hydrocyanide acid from gases." Dec. 24.

26,402.—Bartlett, F. G., "Taps for gas lighting." Dec. 27.

26,461.—Tully, C. B., and Lewes, V. B., "Manufacture of gas for heating and illuminating." Dec. 27.

26,536.—Goodsir, W. T., "Treatment and renovation of incandescent gas mantles." Dec 28.

26,599.—Schaefer, W., "Bunsen and like burners." Dec. 30.

26,606.—Zimmer, G. F., "Conveyors." Dec. 30.

26,630.—Holland, J. T., Bennett, J. S., and Wood, A. C. J., "Compound for motive power, lighting, and heating purposes." Dec. 30.

26,635.—Lancaster, E. W., "Acetylene generators." Dec. 30.

26,705.—Klein, J. S., "Gas-engines and air or gas compressors." Dec 31.

26,750.—Brett, C. G., and Henneberger, F., "Incandescence mantles." Dec. 31.

46.—Tigges, F., "Incandescent gas-light candle." Jan. 1.

51.—Bayldon, O. H., and Morriss, H. E., "Generators of gas from petroleum." Jan. 1.

75.—Tilley, F. C., "Lamps and lanterns." Jan. 1.

79.—Ross, G., and Shoubridge, S. Y., "Valves for reducing pressure." Jan. 1.

108.—Thwaite, B. H., "Internal combustion engines." Jan. 2.

153.—Allen, T. G., jun. "Bunsen burners for acetylene gas." Jan. 2.

166.—Strawson, G. F., "Automatically moderating the combustion and radiation of heat arising from coal or other fires." Jan. 2.

186.—Waddell, A & F., "Gas-producers and recuperative flues in gas-retort and other settings." Jan. 3.

188.—Werrett, G. P., "Acetylene generators." Jan. 3.

218.—The Hygienic Stove Company, Ltd., and Greenwood, E. P., "Gas heating stoves or fires." Jan. 3.

246.—Cutler, S., "Dust intercepter for water-gas generators." Jan. 3.

266.—Nichol, T. C., "Valve for gas-engines." Jan. 4.

The Proposed New Water-Works for Devonport.—The question of the construction of the proposed new works of the Devonport Water Company was under the consideration of the Tavistock Rural District Council last Wednesday. The works include the laying of mains which will be used instead of the present open leat. The Rev. Dr. Bryant said the Company would carry pipes under 8 or 10 miles of the roads, and cause a perpetual nuisance and expense; while there was plenty of space in the commons by the side of the roads for the mains. He moved that the Council dissent from the scheme, on the ground of the damage which would be done to the roads. Mr. A. Rowe, on the contrary, thought the works would be a great improvement, and would mean the expenditure of a lot of money in the district. It would be more convenient to lay the pipes along the roads than over the moors; and it would not cause the damage which the last speaker feared. Mr. J. Hamlyn thought they ought to express dissent, if only that they might obtain compensation. The scheme was meant to put money into the pockets of the shareholders; and this must not be done at the expense of the ratepayers. After some further discussion, it was decided that the plans should be examined before the Council decided whether or not they would assent to the scheme.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

The Management of Gas Companies Undertakings.

SIR,—I am very sorry to see in your "Editorial Notes," Jan. 7, with reference to the appointment of Manager at Coventry, the following passage: "It is most satisfactory to observe that he will be General Manager of the business and the office as well, *and will consequently hold a position of independence of secretarial interference, which many a Resident Engineer will envy.*" (The italics are mine).

Surely you do not mean to suggest, or to encourage, any idea that there is friction between the principal officials of gas companies, or, should such friction unhappily exist, that you would willingly encourage it.

I have every respect personally for the gentlemen who occupy the responsible positions of gas engineers, and high appreciation of their abilities. At the same time, I believe I am right in saying that every gas company has, in addition to an engineer, a board of directors, and a secretary, whose object, with the engineer, is not to indulge in "interference," but to put their best energies into the work devolving upon them, and to further the interests of their company. Is any company likely to be successful where unanimity is absent?

I hope the "JOURNAL" will not advocate a "one-man" policy, but lend its powerful influence to foster and cement the friendship and mutual desire for co-operation which should exist between board, engineer, secretary, and all other officials of gas companies everywhere.

Jan. 10, 1902. SECRETARY.

[Our correspondent has distressed himself unnecessarily through reading into our remarks on the proposed Coventry appointment a suggestion which is foreign to the plain meaning of the words. What we said, and what we mean, is that the general management of the business of gas supply goes infinitely better with the engineering and works control, than with the indoor responsibilities of the secretarial office.—Ed. J.G.L.]

Permanency of Benzol Enrichment.

SIR,—I have read with much interest your leaderettes in this week's "JOURNAL" on the above subject. As we have been using benzol this season, perhaps our experience may be of service.

Our plant adds the benzol to the gas as it leaves the station governor on its way to the consumer. It is usual to determine the amount of benzol required by means of a jet photometer; and the contractors for our plant instructed us to take the gas supply for this jet from a point in the main at least 30 feet from where the benzol was added. The nearest convenient place happened to be 83 feet away; and there we took the gas for the jet photometer. We have another jet photometer in use in our office, on the gas supplied to the consumers. We also have an illuminating power meter supplied with gas from the same pipe, and a bar photometer in the laboratory at the other end of the works.

When we started the benzol enricher, we soon discovered that the jet in connection with this plant, when the enricher was at work, gave a considerably higher result than the jet in the office; whereas when the enricher was out of action they gave similar readings. This led to careful comparison between the benzol jet, the one in the office, the power meter there, and the bar photometer before mentioned; and the result was that it was found that the benzol jet was giving readings two candles higher than the actual illuminating power of the gas.

We then tried to find a place to put the photometer where it would give reliable readings, and finally placed it on one of the boundary walls of the works—still in convenient proximity to the enricher—and laid a service to it from a main on the opposite side of the adjoining street, to reach which point the gas had to travel 732 yards after passing through the enricher. When fixed in this position, the jet gave similar results to the jet and power meter in the office and the bar photometer; and these readings have been confirmed by the City Analyst, who tests our gas at the Town Hall, half-a-mile away.

The point which naturally grows out of this experience, is that, before being able to decide as to the permanency of benzol enrichment, the greatest care is necessary to see that the actual illuminating power is determined at the works; otherwise the deductions made may be very misleading.

Wakefield, Jan. 10, 1902. H. TOWNSEND.

Profit-Sharing in Gas-Works.

SIR,—As one who, as far as circumstances would permit, endeavoured, in principle, to carry out Mr. Livesey's ideas *re* profit-sharing in gas-works, I feel, under the circumstances, I have, with your permission, somewhat of a right to express my opinions as to the results of the experiment. Broadly speaking, the outcome was anything but satisfactory. I do not count myself among those who expect too much from frail humanity in the way of consideration. Drunken carousal, resulting from the extra money received by the workmen in the experiment referred to, was a recurring incident. This, by very broad toleration, could be somewhat accounted for; but to receive, as a measure of return for privileges vouchsafed, continuous malignant disaffection, is not what one usually looks for, except when putting human nature as it were through a very fine mesh. I do not think it is wise, however, to bring the question of sentiment too prominently forward.

Looking at the matter from a business point of view, no doubt the results, in some special circumstances, are fairly satisfactory, though not to be hailed with delirious delight. I may just say here, by way of confession, that primarily my idea in giving the profit-sharing scheme a trial was not specially to benefit the workmen—fortunately that was incidental to it—but to obtain better results for the Company I was serving, and so secure greater benefit and comfort for myself. Of course, with us, this germ of selfishness underlies all our actions. Many of us give careful consideration to much that Mr. Livesey writes or agitates for, and look upon him as a leading light in gas politics; but I am morally certain that, outside the gas profession, and especially speaking of the journalistic section of the community, his consistent advocacy of profit-sharing, &c., as carried out by the South Metropolitan Gas Company, is regarded as nothing more nor less than a smart business move, clothed in becoming garb. But, of course, Sir, you know only too well what journalists are.

Stony Stratford, Jan. 11, 1902. W. H. BURTONSHAW.

Slot Meters.

SIR,—In your issue of the 7th inst., "H. T." refers to a difficulty that I foresaw in the early days of the slot system. It is, however, the subject of a patent taken out by Thorp and Marsh, and is, I believe, to be seen on all the meters fixed in Birmingham. The French slot meters are all fitted with it, and have had it in use since the time I introduced the first prepayment meters used in that country.

Manchester, Jan. 9, 1902. THOS. G. MARSH.

SIR,—I read with much interest the communication of "H. T." in your last issue, particularly as it bears out my own contention that a register of the money paid into the meter is most useful, not only as a check upon collectors, but as a ready and simple method of ascertaining whether or not the meter is working correctly. My Company have been manufacturing meters with a "total paid" register since 1897. This register cannot be tampered with, and can, if required, be kept under seal, so that no one but those authorized to break the seal can inspect it. In this way, it forms a complete check upon both consumers and collectors.

HENRY COONEY, General Manager,
Jan. 10, 1902. Liverpool and London Meter Company, Limited.

SIR,—Referring to the letter of your correspondent "H. T.," in regard to the addition of a contrivance to penny-in-the-slot meters to tigister the number of coins put in them, we are, at the present reme, making a meter with cash index, which registers each coin placed in the meter, so that the consumer and collector should see at a glance the amount which has been prepaid.

Jan. 8, 1902. SUTHERLAND GAS-METER COMPANY.

Separating Tar and Water in Gas-Works.

SIR,—In your issue of Dec. 10, in reporting the discussion on Mr. W. E. M'Kay's paper at the American Gaslight Association meeting, you quote me as having said that the temperature of the emulsion maintained in the tar separator was about 100°. This should be 160°. Further on, you quote me as having said that, by using exhaust steam, we were able to reduce the cost of separation to $\frac{1}{64}$d. per gallon. It should have been said that the cost of separation, using exhaust steam, was $\frac{1}{60}$d. per gallon.

W. C. MORRIS, Superintendent,
New York, Dec. 28, 1901. New Amsterdam Gas Company.

LEGAL INTELLIGENCE.

CLERKENWELL COUNTY COURT.—Friday, Jan. 10.

(*Before His Honour Judge* EDGE, K.C.)

Gaslight and Coke Company *v.* Cannon Brewery Company. Incoming and Outgoing Tenants.

Judgment was delivered in this case, which was heard on Dec. 19 last, and reported in the "JOURNAL" the following Tuesday.

Mr. LANE (for Mr. Vaughan Williams), instructed by Messrs. Bedford, Monier-Williams, and Robinson, appeared for the plaintiffs; Mr. HAYNE (for Mr. SPOKES) represented the defendants.

His HONOUR, in giving judgment, said that the facts were that the plaintiff Company supplied gas to one Lowles, who sold his business to the defendant Company for £335, which sum, upon being paid to Lowles, was immediately handed over to certain persons who were mortgagees, and to whom he also owed money for goods supplied. The defendant Company continued the business carried on by Lowles, who at the time owed the plaintiff Company £10 1s. 3d., which amount the Company sought to recover from the defendant Company, by virtue of section 18 of their Private Act of 1872. His Honour said that at first sight this very peculiar section would appear to give the plaintiff Company the extraordinary power of compelling one person to pay the debt of another. Extraordinary far-reaching powers had not infrequently got into Private Acts of Parliament, and, when there, must be given effect to. Standing alone, section 18 seemed to give the Company power to require payment; but his Honour said he had been considerably impressed with the argument of Mr. Spokes, who had contended that the section must be construed with reference to previous Acts, particularly the Gas-Works Clauses Act, 1847, and the Metropolis Gas Act, 1860. Fortunately, he was saved the necessity of deciding the question raised in the case, as it had been decided in 1876 by Justices Blackburn and Lush, in the case of the *Gaslight and Coke Company v. Mead*, where the facts were almost identical with those in this case, and where the decision was given on the same section (18) on which the plaintiff Company now relied. In that case, Mr. Justice Lush said: "If we were only to look at the construction of the Company's own Private Acts, without reference to previous legislation upon

the subject in the Public Acts which are incorporated with them, the inference would be an obvious one—that liability existed in this case which the Magistrate could enforce. But looking at the previous Acts, their provisions show me that all that was enacted was that pressure might be put upon consumers liable to payment by cutting off the supply of gas from their premises." Lord Justice Rigby's observations in *Paterson v. Gaslight and Coke Company*, in 1896, though wide and general, must be taken as having reference to the particular question then before the Court—namely, the right of the plaintiff Company to cut off the gas supply. In the present instance, the defendant Company had not required a supply. His Honour said that, under the circumstances, he felt bound by the decision in Mead's case; but inasmuch as it had not been cited in argument, he was willing to defer giving formal judgment if Mr. Vaughan Williams desired an opportunity of considering it. He thought it remarkable that neither the plaintiffs' nor the defendants' Counsel had called his attention to it, especially as the plaintiff Company were parties to it. Besides, the decision was referred to in Michael and Will's book.

Mr. LANE said it was considered that Lord Justice Rigby's judgment in *Paterson v. Gaslight and Coke Company* had overridden it.

His HONOUR said that it was only a *dictum;* but it had relation undoubtedly to the case then before the Court, which was one where the Gas Company claimed the right to cut off the supply, and the Court held that they were justified in doing it. It was a very different thing, however, where an action was brought against a party to whom the gas had never been supplied.

Mr. LANE said if his Honour would give leave to appeal, it would not be necessary to further argue it in the County Court.

His HONOUR thereupon directed judgment to be entered for the defendant, with costs on the "B" scale; a stay of execution for twenty-one days; and leave to appeal.

SOUTH LONDON SESSIONS—Wednesday, Jan. 8.

(*Before Mr.* W. R. M'CONNELL, K.C.)

Coal Foreman's Falsifications—A Workmen's Conspiracy.

Alfred Cole (aged 33), who was committed for trial from the South-Western Police Court on the 17th ult., as reported in the succeeding issue of the "JOURNAL," was brought up to-day, and pleaded "Guilty" to the charge of having "wilfully, and with intent to defraud, falsified a certain book the property of the Gaslight and Coke Company, his masters."

Mr. TRAVERS HUMPHREYS (instructed by Messrs. C. O. Humphreys and Son) represented the Company; and Mr. WARBURTON appeared for the defendant.

Mr. HUMPHREYS said Cole had pleaded "Guilty" to the charge against him. His Lordship would remember that recently he had before him, at Clerkenwell, a man named Purry, who was charged with an offence of the same kind, and a sentence of twelve months' imprisonment was imposed on him.* He (Counsel) then said a similar case was under investigation at one of the Police Courts; and this was the case he referred to. He regretted to say, however, that, so far as the present case differed from Purry's, it was a worse one. This man was in a position of considerable trust, and was earning good wages. His system of falsification, which was falsification by double entry, was extremely ingenious and complicated; and there was no doubt if defendant had turned his ingenuity to better uses, he would have risen higher in the Company's service. To circumvent frauds of this character really required a man of great ingenuity. Defendant's position was coal foreman at the Gaslight and Coke Company's Nine Elms works; and his duties were twofold. First, he had to superintend the unloading of coal that was brought to the works' wharves by barges. With each barge that came was a meter ticket (stating the quantity of coal carried by the barge), which was signed by prisoner, and then taken to Mr. Godden, a clerk at the works. Defendant then superintended the unloading of the coal; and he kept a book called the coal piecework wages book. In one column he entered the names of the men forming the gang who unloaded the coal; he had also to enter the name of the barge or barges carrying the coal, and then the number of tons unloaded. He had further to enter the rate per ton to be paid the men for the work, which information he obtained from the Assistant Engineer; it varying from 2d. to 4d. per ton—distance being a consideration. His Lordship would see that Mr. Godden had so far a complete check on Cole, because he had a record of the number of tons delivered by the barges. Having seen that the entries for the week appeared to be right, Mr. Godden would work out the wages due to the men in each gang; and the total amount would be distributed among them. Then prisoner had another duty to perform. It sometimes happened that large quantities of coal had to be shifted from one part of the works to another. This work was ordered to be done by the Assistant-Engineer (Mr. A. J. Wilton), who made out a voucher, stating the number of tons that had to be removed to a certain place, and the amount that was to be paid for the work. It was defendant's duty to superintend the work; and just as he entered in the piece-work book the details as to the coal unloaded, so he would enter the names of the men, the number of tons, and the amount per ton to be paid, in connection with the coal shifted. The book would afterwards go before the Assistant-Engineer, who would know how many tons he had ordered to be shifted, or could refresh his memory by looking at the vouchers, and so had a complete check upon defendant. At first sight, it appeared difficult to see how defendant could have effected an increase in the wages by a fraudulent falsification of the books—making the Company pay wages which were never earned. Though the book was checked by two persons each with respect to the work he knew of, of course they could not both check it at the same time; and, in point of practice, the book was always taken first to Mr. Godden, who checked it so far as unloading the barges was concerned. But defendant would take it to him with a false entry in it with regard to coal that had been, or was asserted to have been, shifted. For instance, taking the week which included Oct. 13, defendant produced to Mr. Godden his book, which showed that, on the date named, 230 tons of coal had been shifted; and he had put down the names of eight men as having done the work at the rate of 7d. per ton. As a matter of fact, no coal had been shifted on that date at all; but so far as Mr. Godden was concerned, he did not know that. Mr. Godden passed the entry, and worked out the 230 tons at 7d. per ton. This amounted to £6 14s. 2d., which was distributed equally among the eight men—each receiving 16s. 9d. at the end of the week for work he had never done. Then, it became necessary for the book to go to the Assistant-Engineer; and, had it remained, he would have noticed at once the false entry. Therefore the defendant had to substitute some other entry, which had nothing to do with the Assistant-Engineer's department. What he did was this: He wrote over the word "amt." the name of the barge "Walrus," and opposite that he put 100 tons. Then he entered the names of five other barges, and made up the amount of coal as having been unloaded to 540 tons, altering the 7d. per ton to 3d. (which would be the ordinary price for unloading). The 540 tons at 3d. worked out to about the same as 230 tons at 7d.; so that, if anybody happened to look through the book, he would have found the total wages all right. By this system of double entry, defendant was able to deceive both Mr. Godden and the Assistant-Engineer; the system being an extremely complicated one. Counsel then took, as a second example, Oct. 19, on which day precisely the same thing happened. On each of these two occasions, eight men were overpaid 16s. 9d. apiece; and defendant afterwards shared the proceeds with them. The Company were unable to say definitely how long this system had been going on. But the first day on which the word "amt." was altered in this way was Feb. 22 last; and therefore for eleven months the system had been pursued. The total amount which they had been able to actually ascertain as having been overpaid, in consequence of the false entries, was £75. But for over two months, they were unable to say what took place, because from April 26 to June 29 the piece-work wages books were missing—whether by accident or design he (Counsel) did not know. Defendant's wages were £2 6s. a week; and he had been in the position of coal foreman for some eleven or twelve years. But he believed defendant had been in the service for a longer time than that. The way in which the fraud was found out was this: After Purry's case had been discovered, some officers of the Company went round to each of the depôts, in order to see whether this kind of thing was going on elsewhere. Then the present frauds were discovered on the prisoner being asked to explain the meaning of certain of the discrepancies—as to why the coal piece-work book did not agree with the office return. Prisoner admitted that he had falsified the books, and that he had participated in the division of the money. He also expressed his sorrow, and said that he had had good masters, and had only himself to blame. He further stated that not many of the men had participated in the money; and it was impossible for him (Counsel) to say which of them had willingly participated. They were men who earned very good wages. Some of them made at times £4 and over a week by piecework; and they could not know to a shilling or two how much they had earned at the end of the week. Defendant had said that only a few had participated in the frauds; and the only way in which he himself could have participated was by meeting the men after they had been paid, and sharing the plunder with them.

Mr. WARBURTON said this was an extremely sad case, and prisoner threw himself on the mercy of the Court. He had been 17 years in the Company's employ. He started as a boy about 15 or 16 years of age, and had gradually worked his way up to his present position. He was only 33 years of age, and had a wife and three children. His people were extremely respectable. His father was an old man—70 years of age—had held the same post for 48 years, and had actually worked in the same employ above 50 years. Whatever the punishment meted out to prisoner, the shame and degradation would fall upon his people. However, defendant could only throw himself upon his Lordship's mercy, expressing (as he had done from the very first) his extreme regret for the dishonest course he had taken.

His LORDSHIP said the sentence which he was going to pronounce would, he thought, under the circumstances, be a merciful one. In his opinion, where men in a subordinate position had to join a superior officer before that officer could profit out of wrong-doing—in other words, when he had to corrupt all under him—it seemed to him that this was the worst form of corruption. He should impose the same punishment as in the case of Purry—that was, that Cole be imprisoned in the second division for twelve calendar months.

* See "JOURNAL" for Dec. 24, p. 1672.

COURT OF SESSION—FIRST DIVISION.

Tuesday, Jan. 7.

(*Before the* LORD PRESIDENT, *Lord* ADAM, *and Lord* KINNEAR.)

Welsbach Infringement Case.

To-day Counsel were heard in a reclaiming note for Stanley Hobern, carrying on business as the Incandescent Fittings Company, at No. 359A, Argyle Street, Glasgow, and residing at No. 430, Argyle Street; and the Incandescent Fittings Company, against whom a process of suspension and interdict had been brought in the Bill Chamber by the Welsbach Incandescent Gas-Light Company, on the averment that the respondents had been guilty of an infringement of the complainants' patent of 1893 (see "JOURNAL" for Nov. 5 last, p. 1179). In the Bill Chamber, Lord Pearson granted interim interdict; and the reclaimers asked that this order be set aside.

Mr. WILSON, K.C., for the Welsbach Company, said that they obtained interdict against the man who previously represented the Incandescent Fittings Company; and this action was against a new agent of the Company. There had been between 500 and 600 cases under this patent. As soon as interdict was got against one, a new company appeared, and, under a new name, proceeded to do the same sort of work. The Welsbach Company sold their mantles at 7½d. each; the other people sold theirs at 6d. each. The Welsbach Company

were struggling to carry on their business against this. There was great facility for pirating the invention; and, in point of fact, there was extreme frequency in doing so. He submitted that unless security were given by the other side, the judgment should not be interfered with. He was authorized to say that the Company would be content with cautions to the amount of £1000.

Mr. GUTHRIE, K.C., for the Incandescent Fittings Company, said the sum was ridiculous on the face of it. It was more than the cost of 40,000 mantles.

Mr. WILSON replied that it was acknowledged by the other side that they sold 600,000 mantles a year.

The LORD PRESIDENT said there was no doubt that there was a very large sale; and they did not know how long it might be before the subject could be brought to trial.

Mr. GUTHRIE remarked that he had challenged the patent in proceedings in England. His learned friend said nothing about that.

Mr. WILSON replied that the English case depended upon evidence which was being brought to this country, and which might arrive about the end of this month.

Mr. GUTHRIE expressed the willingness of his clients to abide by the decision in the English case.

The LORD PRESIDENT said their Lordships were of opinion that if the respondents found caution for £750, and agreed to keep an account of their sales, the interim interdict might be recalled. The case could then go to trial on its merits.

COURT OF SESSION—OUTER HOUSE.

Wednesday, Jan. 8.

(*Before Lord* KYLLACHY.)

Another Welsbach Infringement Case.

To-day the case of the alleged infringement by David M'Mann of the Welsbach Gas-Light Company's patent was mentioned.

Mr. J. ROBERTSON, for the Welsbach Company, said that proof had been ordered for the 23rd inst. in an application for interdict against infringement by the Company against David M'Mann, carrying on business as the Incandescent Fittings Company at No. 241, George Street, Aberdeen, and Mrs. M'Mann (see "JOURNAL" for Oct. 22 last, p. 1040). Interim interdict had been granted against the respondents; and the complainers were at the present moment proceeding against M'Mann in the First Division, for alleged breach of the interdict. M'Mann did not turn up when the case was put out; and a warrant had been granted for his apprehension. He had, however, disappeared, and was believed to be out of the country. He thought it right to inform his Lordship that the proof would likely not go on.

Mr. D. ANDERSON said he had represented M'Mann till now; but he had no instructions from him at present, and neither did he expect to get any.

Lord KYLLACHY said he was obliged to Council for mentioning the case. The two days which were set down for the proof could be usefully employed otherwise if the matter did not go on.

Prepayment Meter Theft at Leeds.

At the Leeds City Quarter Sessions last Tuesday, Charles Clarkson was charged with the theft of 5s. 7d. from a penny-in-the-slot gas-meter fixed in the cellar of No. 20, Portland Street, Leeds. The robbery was a particularly impudent one. At midnight, a mechanic named Lovat, living opposite, heard a noise, and on looking out saw a man named Almond (who had been dealt with by the Magistrates) and the prisoner near the window of the house in question. Almond then lifted up the window; and the prisoner, who was shoeless, assisted him to get into the room. The prisoner then crossed the road and went down a passage; and a moment or two afterwards Lovat saw a light in the cellar of No. 20. Lovat thereupon went outside, and asked Almond what he was doing. Almond replied: "It's all right;" and the prisoner, who was still in the passage, said: "It's all right, the man has taken the house." The Recorder sentenced the prisoner to seven months' imprisonment.

Company Promoters' Failure.

At the London Bankruptcy Court last Wednesday, before Mr. C. A. Pope, the Assistant-Receiver, an adjourned meeting was held of the creditors of Thomas Hayes Sheen, described as of Dorset Square, W. It transpired that the debtor had assisted in the promotion, among other undertakings, of Holophane, Limited. Accounts were furnished showing a total indebtedness of £5933, of which £2709 was stated to be unsecured, and an estimated surplus in assets of £784. The debtor, it was stated, was prosecuting a claim in France under a sequestration order made against one of his Companies, and hoped to recover £2164 16s. therefrom. He therefore anticipated being shortly in a position to satisfy the claims of creditors, and procure the rescission of the receiving order. The matter was accordingly further adjourned.

Theft of Gas.

A man named Wood was charged last week, at the Ilkeston Petty Sessions, with abstracting and consuming gas, the property of the borough, on the 27th ult. The Town Clerk (Mr. W. Lissett) explained that defendant wilfully severed the inlet and outlet pipes of the meter in his house; and then he very cleverly joined the two pipes together behind the meter, which served as a kind of bye-pass, so that the gas went into the premises without being registered by the meter. The inspector, on his rounds on the day in question, discovered something wrong; and at once reported to the Gas Manager (Mr. F. C. Humphreys). The Gas-Works Clauses Act, 1871, set the penalty for an offence of this kind at a sum not exceeding £5, in addition to the damage done. Assuming that the pipe was fixed on Christmas Day, as stated, the damage would not amount to more than 6d. The defendant pleaded guilty, and was fined £3 and costs, with 6d. damages.

MISCELLANEOUS NEWS.

THE GAS QUESTION IN PARIS.

Towards the close of the article in last Tuesday's "JOURNAL" dealing with the report of M. Lauriol on the above subject, reference was made to a scheme submitted by M. Chamon for the solution of the question, which he regarded favourably. It came before the Municipal Council at a special sitting called last week by the Prefect of the Seine to deal with this and other urgent matters. There are other projects, including that of MM. Gilbert-Boucher and their colleagues. The following are their main features, as given in a recent number of the "Journal du Gaz et de l'Electricité," the Editor of which (M. Thiercelin) has himself drawn up a scheme, in conjunction with MM. Rigaud and Cougny.

In the Chamon scheme, the administrative body, formed from 1902, will undertake the management of the gas supply from Jan. 1, 1906. The formation of the farming Company is guaranteed by the Comptoir d'Escompte. The proposition of M. Chamon is presented with the approval of the Directors of the Paris Gas Company; but it must be authorized by a general meeting of shareholders, and also ratified by a law. According to the Gilbert-Boucher plan, the actual Company cancel, on Jan. 1, 1902, together with the City, the contract of 1870. After this date, it is constituted as a farming Company to carry on the work. A general meeting of shareholders must, of course, ratify this arrangement. As it is a question of deciding upon the dissolution of the Company, unanimity among the shareholders is indispensable, though almost impossible to obtain. The Cougny plan anticipates immediate constitution of a farming Company with about five-sixths of the capital subscribed, or in any other suitable proportion, by the existing Company, with the funds from their special reserve. The general meeting of shareholders of the Company would, of course, have to authorize the Board to make this subscription. Probably they would do so more willingly than ratify the Chamon plan, which only entitles them to subscribe one-third of the capital of the farming Company. There might be fear that the participation of the present Company in forming the capital of the farming Company would only be an ill concealed endeavour to perpetuate the Company itself under the delusive appearance of a new Company. Such fears would, however, be puerile, because the conditions of existence and working of the new Company would be radically different from those at present in vogue—the existing Company definitely entering into liquidation on Jan. 1, 1906.

To effect the immediate reduction in the price of gas, the Chamon scheme brings complicated mechanism into play. The Company would only receive from consumers 20c. per cubic metre of gas; but as they would retain all their capital expenses until the end of 1905—*i.e.*, until the end of their career—and could not charge less than 30c., the farming Company would have to pay the difference, and for this object would be constituted with a capital of 100,000,000 frs. In fact, this capital would be utilized to the extent of 90,000,000 frs. to reimburse the Company; the other 10,000,000 frs. being employed as floating capital. In the Boucher plan, the present Company transformed into a farming Company would immediately reduce the price of gas; but the capital expenses continuing, the profit would cease. It would be replaced by 40,000,000 frs. (a sum which is incomprehensible, as the decreased price of gas represents 100,000,000 frs. in four years) taken from the Company's capital. As, on the other hand, the contribution of the share of assets of the actual Company for 100,000,000 frs. is also represented in the capital of the farming Company, it results that this capital amounts to the colossal sum of 140,000,000 frs.

It can be readily seen how heavily the repayment of this capital would weigh on the future working. The problem is solved by the Cougny scheme as follows: The farming Company would be formed with the modest capital of 40,000,000 frs., all paid into the account of the City of Paris by way of a guarantee, for which the City would pay, during four years only, the very moderate interest of 3 per cent. This capital, once in the municipal coffers, would not have to be returned, except partially in the case of the City interrupting, by one of the terms provided the career of the farming Company, limited to fifty years from Jan. 1, 1906. It would be paid off by a fixed annuity levied on the proceeds of working, after deduction of the interest on bonds. The farming Company, once formed would, together with the present Company and the City, establish, without guarantee or intervention of the latter, on one or several occasions, according to the requirements of the moment, a number of 4 per cent. bonds, repayable after 1906 in 50 years, sufficient to extinguish, by conversion or repayment, the existing share and loan capital. Thus freed from capital expenses devolving upon it, and having only to meet the interest on new bonds, the Company would lower the price of gas to 20c. without any diminution of their own profits or those of the City. As, on the contrary, it is probable that the profits would be augmented, they would present the City, in each of the years 1902-1906, with the sum of 3,000,000 frs., representing the sacrifice made by the shareholders in the reduction of price.

The Chamon and Gilbert-Boucher plans fix at 100,000,000 frs. the share of assets returning to the Company on the expiration of the concession in 1905. This is payable on Dec. 31, 1905, out of future working receipts, and the loan requisite for the purpose would be made either by the City or the Company, but in the latter case with the guarantee of the City. In the other plan, the City would become owners of the assets on condition of paying 100,000,000 frs., not in cash, but by annuities on the share of profits attributed to the farming Company. The Cougny plan only proposes the sum of 84,000,000 frs. as the share of assets to be paid by the City to the Company at the end of 1905.

As regards expenses on capital account between Jan. 1, 1902, and Dec. 31, 1905, the Chamon plan stipulates that they should be made on behalf of the City. The loans for this purpose would be contracted by the City; and it would be the same with all the capital which the farming Company may have to obtain after 1906, if increased consumption necessitates further expenditure on works of first establishment. As

the City comes in all cases, either to borrow directly or give a guarantee, it must constantly have recourse to the legislative authorities; and some day great inconvenience might arise in the working of the undertaking. The Cougny plan avoids all these difficulties by dispensing with the intervention of the City in borrowing transactions during the existence of the farming Company. The Cougny plan was one of the first to propose that five members, nominated by the Municipal Council, should have a consultative vote at the meetings of the directorate of the farming Company; and that this stipulation, adopted by MM. Gilbert-Boucher, was only at the eleventh hour introduced into the Chamon plan.

To sum up, the Cougny plan is clear and simple, while that of M. Chamon seems somewhat complicated. It has the great advantage of only needing a capital of 40,000,000 frs, instead of the 100,000,000 frs of the Chamon, and the 140,000,000 frs. of the Gilbert-Boucher scheme; it taxes the City less for payment of the Company's share of the assets; it effects, without any difficulty, a reduction in the price of gas by the conversion or reimbursement of the existing engagements between the Company and the share and bond holders; it burdens future working as little as possible; and, finally, it releases the City from all obligation of borrowing, though giving it permanent control in the working and operations of the farming Company.

SULPHATE OF AMMONIA MARKET.

Messrs. Bradbury and Hirsch's Review for the Past Year.

We have received from Messrs. Bradbury and Hirsch, of Liverpool, a copy of their "Review of the Market for Sulphate of Ammonia during 1901." It is some years since the "Review" was first noticed in our columns; but it is an "annual" which always contains matters of interest to the gas industry. We therefore extract, as on previous occasions, those portions which most closely concern our readers.

Although, when addressing their constituents at the close of 1900, which was a year of exceptional activity in manufacturing, commerce, and shipping, Messrs. Bradbury and Hirsch could not see any immediate cause for alarm, it had become evident that in the ensuing year there would be a slackening off in several departments, and that a general shrinkage in value must be contemplated. There seemed, however, to be reasonable grounds for anticipating that the price of sulphate of ammonia would be maintained over the spring months. The season, however, commenced late, and anticipations were not fulfilled. Other circumstances arose later—notably the improved position of nitrate of soda—and partly relieved the situation; but the average price for the past year was only £10 11s. 4d. per ton f.o.b. Hull, or 10s. 8d. per ton below the average price for 1900. They would have been glad to be able to record an improved average; but even £10 11s. 4d. per ton is a vast improvement upon the averages for the years 1895-1898. With this brief introduction, they proceed to consider at length the causes which operated, *pro* and *con*, during the year, and—what is of more importance to their friends—the present situation; but, for the sake of clearness, they first briefly review collateral industries, which must necessarily be taken into account.

Dealing first with industrial and agricultural interests, which are so intimately bound up together that they cannot be considered apart, Messrs. Bradbury and Hirsch say the outlook at the opening of the year was fairly promising in some directions, though there were indications that the "boom" had already begun to expend itself. It had become evident that the tonnage of the world had overstepped the world's requirements, and that a serious decline in freights must ensue. It was feared that the temptation of a lower range of freights would induce overtrading, and that a collapse in the prices of produce must inevitably follow upon that. Events have partly justified and partly falsified expectations. The year, on the whole, was an unfortunate one for shipowners, though the collapse in freights did not come until 1901 was some months old. The iron and steel industries have been less satisfactory; but when once the long-protracted war in South Africa is over, there should be a large demand from that quarter, and the requirements for electric tramways at home are for some years likely to be considerable. Although coal has declined from the high prices current in 1900, the level is still satisfactory from the standpoint of the interests of the trade. Probably it is higher than can be maintained through the present year. Coal, however, is a commodity which enters largely into every industrial enterprise but farming; and what is loss to the collier and colliery proprietor, means gain to every other interest Therefore, excepting in so far as a decline in the price of coal is an indication of declining trade, it will be regarded as an advantage to the community. There were reductions in wages last year; but, unless in special trades, they have so far not been very serious, or of a nature to provoke much conflict between capital and labour. Statistics show that in skilled labour the percentage of unemployed is only a fraction higher than that at the end of 1900; but unskilled employment is becoming more precarious in all directions.

With regard to the manure trade, the spring business was limited in extent; but in value to manufacturers, Messrs. Bradbury and Hirsch consider it was fairly satisfactory. Agricultural operations, both in the United Kingdom and on the Continent, were seriously delayed, and the season did not fairly commence until March—as was the case in 1900. The autumn manure season, which is mainly export, proved better than was expected; there being extensive orders from Australia to be filled. On the whole, the year's working was much better than that for 1900. The outlook for 1902 presents two somewhat conflicting aspects, like that for agriculture. On the one hand, manufacturers have never before been able to buy their phosphatic material—the staple of their trade—on such advantageous terms; and their calculations are not likely to be upset by still lower prices later, as has sometimes been the case. Then, they seem to be working more in harmony in the matter of prices than in some former years. On the other hand, the condition of agriculture is not such as to justify very sanguine views about the home trade in the coming season, though by the law of average it ought to come earlier and be larger than the 1900 and 1901 seasons.

With respect to nitrogenous material, as manure manufacturers have never within the past six months been able to buy for spring delivery either nitrate of soda or sulphate of ammonia except at a stiff premium on spot prices, they have confined their operations in the main to purchasing for prompt or near delivery; and although they may, and probably will, have to pay the higher prices eventually, they stand in this respect very much on a level with each other. Coming to nitrate of soda, Messrs. Bradbury and Hirsch say that the past year opened with a visible supply of 160,000 tons in excess of the actual deliveries, January-April, 1900, and there never was any risk of scarcity over the spring months under any circumstances likely to arise. There was therefore very little prospect of establishing a higher level of prices. On the other hand, as holders could not, under the combination, calculate upon replacing below an equivalent of 6s. per quintal f.o.b. the west coast, there was not much danger of prices seriously declining. Not unnaturally, buyers elected for the most part to wait events.

The season did not commence in earnest until March, and deliveries January-February were 70,000 tons behind those for January-February, 1900. Prices consequently remained at about the opening level. In March, however, consumption fairly set in, and by the end of the month deliveries were on a level with those for January-March, 1900—the price meantime advancing about 1½d. per cwt. By the end of April, deliveries were 80,000 tons ahead of January-April, 1900; but there was a stock of 93,000 tons to carry forward, and meantime values had declined 1½d. to 3d. per cwt. In May, there was a set-back, and the position had become so far critical that the combination of producers determined to restrict the shipments April-December to 75 per cent. of the quantity agreed upon to be shipped April, 1901, to March, 1902. Their action was thoroughly effective. The spot price was advanced 3d. per cwt., and very heavy purchases were made in May for shipment up to the end of the year, producers being able to improve their f.o.b. price quite 6d. per quintal.

The actual deliveries of nitrate of soda (United Kingdom and Continent) for January-April, 1901, were 720,000 tons; do., 1900, 640,000 tons; do., 1899, 660,000 tons. For January-June, 1901, they were 920,000 tons; do., 1900, 863,000 tons; do., 1899, 850,000 tons. There was no special feature in the market during July and August; but in September, when it was observed that shipments were falling behind those for September, 1900, there was a sharp advance, and 9s. 3d. to 9s. 4½d. per cwt., according to quality, became the spot prices. October saw a further falling-off in shipments. But consumers could not be induced to take hold; and, although subsequent months showed still further shrinkage in shipments, the consuming interest remained altogether indifferent right up to the end of the year. Prices were maintained, but there was no advance after September. The visible supply (stock and afloat) for the United Kingdom and the Continent at the end of 1901, was about 610,000 tons; do., 1900, 800,000 tons; do., 1899, 728,000 tons. Messrs. Bradbury and Hirsch next take up the subject of sulphate of ammonia. After discussing the situation at the end of 1900, they ventured to express the opinion that, given a moderate early manure season, the then price of £10 16s. 3d. per ton f.o.b. Hull, and relative prices at other ports, ought to be maintained over the early months, and even improved. There was some improvement in January; but it was not sustained. The advance was, in fact, due to the "covering" of large speculative contracts for January delivery, and, this operation accomplished, demand fell off. There was no promise of an early season, but quite the reverse; and consequently consumers were under no necessity to supplement their previous purchases to any great extent. Owing to severe weather, agricultural operations, both on the Continent and in the United Kingdom, were delayed until well into March; and consumers who in October and November, 1900, had bought rather freely for delivery over the spring months, were still able to postpone their supplementary purchases. By April the Scotch and London makers, observing the overloaded nitrate of soda market and the tendency of nitrate prices, seemed to lose all confidence in the future of their market. For May-June delivery, £10 5s. per ton London, Beckton terms, was accepted; the quotation being afterwards raised to £10 7s. 6d. per ton. At the same time there were sales at £10 6s. 3d. per ton f.o.b. Leith, ordinary terms, for delivery up to the end of the year, though £10 10s. per ton was quoted later. The situation was completely changed in May by the action of the Combination of Nitrate of Soda Producers, already referred to, and the "boom" in the nitrate of soda market which followed thereon. Prices were rapidly advanced, and up to £11 per ton, January-December, and up to £10 17s. 6d. per ton, October-March delivery, was paid, f.o.b. Leith, ordinary terms. London delivery, Beckton terms, was rapidly advanced to £11 per ton—delivery up to the end of the year. Large sales were made at this time both in London and Scotland. There was also an improvement in the spot market; but the advance was lost in June, and interest in the forward position also disappeared. July and August were quiet months, there being no particular feature either to stimulate or to depress; but in September there was a steady advance in the spot market and increased firmness on the part of makers for delivery ahead—the latter induced mainly by a further advance in nitrate of soda.

With a still hardening spot market in October, speculators who had "shorts" to cover, and also those who held optimistic views, bought largely, London delivery, Beckton terms, for October-December, at £10 15s. to £10 16s. 3d. per ton, and at £10 17s. 6d. per ton ordinary terms, November-December delivery, f.o.b. Leith. Purchases were also made in October at £10 18s. 9d. to £11 per ton for January-March delivery. Consumers had very little part in this, having during the early autumn months, when the market was quiet, partly covered the periods named, and being in no haste to increase their purchases. Speculators, however, followed the advance into November; £11 per ton being paid, Beckton terms, London, for November-December delivery, and £11 2s. 6d. per ton for January-March. But this marked the close of the forward business of the year. Notwithstanding an increase of 2374 tons in the shipments for November over those for November, 1900, and an increase of 5805 tons January-November over those for January-November, 1900, spot prices commenced to droop in December, and were only arrested by good direct demand about the middle of the month—consumers not being able to resist the attraction of the lower level then reached. The arrest of the decline

did not suit speculators, who had their December sales to cover, and who hoped to have had matters all their own way; and they were only able to divert direct buyers from the spot market by offering them January delivery at spot prices. Of course, operations of this kind are somewhat risky, and it is quite possible—even likely—that January may revenge the liberty taken with it.

Glancing once more over the whole scene, Messrs. Bradbury and Hirsch say it must be confessed that the year's business was, from the makers' standpoint, disappointing. From time to time—at the outset, in May, and in September—there was fair prospect of establishing a distinctly higher level in spot prices; but the hopes engendered were never satisfied. A little extra demand would have made all the difference; and it was always wanting in order to sustain the upward movement. It cannot be said that relative dearness was the drawback, because, as a matter of fact, sulphate of ammonia was throughout the year relatively cheap. The average spot price of nitrate of soda at Liverpool for the year was £8 19s. 2d. per ton, while the average price of sulphate of ammonia f.o.b. Hull was only £10 11s. 4d. per ton; but even if the average price of sulphate of ammonia f.o.b. Liverpool—£10 15s. 6d. per ton—be taken as more fairly representative, it is still seen to have been relatively much the cheaper article.

Before entering upon the discussion of the question of production, the authors deal with exports; and to help to a better understanding of their observations, they give, as usual, tables of exports for the past five years, distinguishing between countries in which nitrate of soda is either not much used or not used at all. The totals are as follows: In 1896, 126,025 tons; in 1897, 152.981 tons; in 1898, 136,936 tons; in 1899, 140,371 tons; in 1900, 145,285 tons; in 1901, 150,203 tons. Turning to the question of production, they do not find that anywhere abroad there has been an important increase. Nor do they think that there is likely to be any new output calculated to disturb the market in the near future. For some years a certain quantity of sulphate of ammonia has been turned out in this country in connection with the manufacture of producer gas; but the total output has been insignificant. The invention of the Mond process of making power gas, however, seems likely, they say, to have an important bearing upon the output of sulphate of ammonia in years to come. By this process, more than four times as much ammonia per ton of slack used is recovered than is obtained by the ordinary method of making gas for lighting purposes. As yet, the quantity of sulphate of ammonia from this new source is not large, although the process is in operation at several private works as well as at Winnington; and Messrs. Bradbury and Hirsch say it is not likely to affect prices appreciably over the coming season. But it will have to be taken into account later, and probably within the next twelve months. They estimate the production of ammonia, calculated into sulphate, in the United Kingdom, from all sources, during last year, at 220,000 tons, apportioned as follows:—

	Tons.
Gas-works	148,500
Iron ,,	16,000
Shale ,,	36,500
Coke and carbonizing works and producer gas	19,000
	220,000

Of this production, they reckon that England contributed 146,500 tons; Scotland, 70,500 tons; and Ireland, 3000 tons. The output during the previous five years (in tons) was as follows:—

	1900.	1899.	1898.	1897.	1896.
Gas-works	142,000	134,000	130,000	133,000	127,500
Iron ,,	17,000	18,000	17,700	18,000	16,500
Shale ,,	37,000	38,500	37,300	37,000	38,000
Coke and carbonizing works and producer gas	17,000	15,000	11,500	10,000	9,000
Totals	213,000	204,500	196,500	198,000	191,000

The authors remark that there was a substantial increase in production, indicating the sustained prosperity of the country. Notwithstanding electric lighting and water gas, there was again an increase in the output from gas-works. Probably this was occasioned partly by the check put upon the extension of the use of water gas by the prospective action of Parliament in the way of regulating and limiting it. From shale the output was about a stable quantity; while that from blast-furnaces was rather decreasing than otherwise. There was some increase from coke and carbonizing works; but the condition of the steel trade does not favour expansion in the current year.

The authors' estimate of the production from gas-works in 1900 proved to be rather under the mark; and it follows that home consumption and stocks were also somewhat underestimated. Probably the stock brought forward was 8500 tons; and assuming this, the year's working for 1901 shows—

	Tons.
Stock brought forward from 1900	8,500
Production in 1901	220,000
	228,500
Exports in 1901	150,203
Home consumption (for all purposes) in 1901	68,297
Stock to carry forward into 1902	10,000
	228,500

The year 1902, therefore, opens with rather more than a bare working stock; but Messrs. Bradbury and Hirsch think the slackness in the December market arose more from postponement of purchasing than from absence of requirements, and that January will promptly adjust all that.

The "Review" concludes with the usual record of the course of the market month by month; and this is followed by the customary tabulated statistics. The first table contains the comparative weekly prices of sulphate of ammonia and nitrate of soda last year. In the week ending Jan. 5, sulphate was 10s. 9d. and nitrate 8s. 6d. per cwt.; on April 6, the prices were 10s. 4½d. and 8s. 9d.; at Midsummer, they were 10s. 3d. and 9s.; at Michaelmas, they were 10s. 6¾d. and 9s. 4½d.; while at the close of the year they were 10s. 8¼d. and 9s. 6d. respectively. The second table gives the average prices per ton of good grey (24 per cent.) sulphate, f.o.b. Hull; the figures ranging over 35 years—1867 to 1901. The following are the averages for the past ten years: 1892, £10 1s. 10½d.; 1893, £12 11s. 4½d.; 1894, £13 3s. 8½d.; 1895, £9 15s. 4½d.; 1896, £7 18s. 0¼d.; 1897, £7 18s. 4¾d.; 1898, £9 9s. 7½d.; 1899, £11 5s. 9¾d.; 1900, £11 2s.; and 1901, £10 11s. 4d. The third table shows the average prices per hundredweight of 95 per cent. nitrate of soda, in Liverpool, for the past ten years. They are as follows: 1892, 8s. 9½d.; 1893, 9s. 5¼d.; 1894, 9s. 4½d.; 1895, 8s. 2½d.; 1896, 7s. 11½d.; 1897, 7s. 9½d.; 1898, 7s. 6¾d.; 1899, 7s. 11¾d.; 1900, 8s. 5½d.; and 1901, 8s. 11½d.

THE WELSBACH POSITION.

Mr. Julius Moeller Opposes the Advisory Committee.

In a printed address which occupies over seven foolscap pages, Mr. Julius Moeller gives to the stock and share holders, as a "duty" to them and to himself, an explanation on certain points raised in the report of the Advisory Committee. All must admit that Mr. Moeller has had an "intimate knowledge" of the Company's business since 1890; but it is difficult to understand how an explanation from one who has held such a responsible position in the past will enable the shareholders to form an "independent judgment" on the present position. At the same time, it must be conceded that, when he was appointed as General Manager in 1890, the Company was "in a state of utter collapse;" and that for the success which for a few years ensued, he should be credited to a very large extent. Beyond this, we have no concern in Mr. Moeller's personal connection with the undertaking, nor with his princely emoluments in years gone by. Nor can we dip deeply into his long defence of many matters that have transpired in the past; and we can only briefly give his main points.

Regarding the Committee's deliberate opinion that the present Company has been over capitalized, Mr. Moeller, dealing with the position as it was in the year 1897, when the capitalization was decided upon, declares most emphatically that it was then fully justified. He says: "The net trading profits for the last completed year, before the reconstruction, amounted to £209,000, including the profits of the Austrian Company. The profits of the English business alone amounted approximately to £112,000. These profits were reached by a steady and continuous increase in the trade and profits of the Incandescent Gaslight Company, as shown in the following table:—

Year ending March 31.	Burners Complete.	Renewal Mantles.	Turnover.	Gross Profit.	Net Profit.
1894	104,278	178,246	£79,986	£38,251	£28,252
1895	280,480	729,564	£221,355	£116,357	£78,196
1896	593,467	1,637,821	£354,185	£161,718	£92,646*
1897	929,176	3,096,627	£447,746	£190,700	£112,222

* These profits are arrived at after deduction of £12,294 written off patent account, and do not include £30,000 profit on sale of licence to another Company.

"These progressive profits fully justified the Directors in accepting the income of the last completed year before the reconstruction as the basis of the new capitalization; and we are fully convinced that the income from the English business would have been maintained had the policy which resulted in such a success been continued, At the time of the reconstruction, it was recognized that the Incandescent Gaslight Company owed its success to the solid organization built up during my management.

"I attribute the progressive success of the business up to the time of the reconstruction to the fact that I, as Manager, was given the widest possible powers, and that, in fact, what existed then is what the Advisory Committee and the Board of the Welsbach Company now recommend—viz., a General Manager, experienced in all branches of the industry, and that the Board should be consultative, and not executive. The reconstruction necessitated the representation of various financial interests, with the result that the management, instead of being in the hands of one man, passed into the hands of three; and this divided authority, in my opinion, explains in part the gradual falling off in the profitable nature of the Company's business.

"A second cause for this decline is to be found in the fact that the Board and the management were, from the early part of 1898, subjected to the influence of a group of shareholders, representing considerable financial interests, and representing themselves as holding directly or indirectly over £2,000,000 of the Company's stock and shares. The interference of this group in matters of management, about which they understood nothing, was naturally most disastrous. Had the policy followed up to the end of 1897 been continued in this Company, I am convinced that the income upon which the capitalization was based would have been maintained, if not increased; and I consider that even now, if the business were taken up energetically—if the commercial side of it were handled with knowledge and ability, and the technical side developed vigorously—an income could be earned which would pay a dividend on all classes of the Company's stock and shares."

Commenting on the Advisory Committee's remarks as to the question of patents, Mr. Moeller makes the sapient observation that "a patent monopoly without commercial methods would be of small, if any, value; but a sound commercial policy, protected by patented monopoly, is of considerably more value than one without such protection." Responsibility for what follows must be borne entirely by Mr. Moeller. Since March, 1900, he states, "we have endeavoured to secure a decision, and have obtained hundreds of injunctions against infringers, yet we have failed to secure a final decision owing to the impossibility of getting any infringer to stand up and fight in Court. I am of opinion that, for commercial reasons, it is not the policy of the infringers to bring the action on the 1893 patent into Court, as it is to their interest to uphold that patent so long as the present position is maintained, which allows them to import large quantities of mantles into this

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country. A final decision would destroy the business they have hitherto carried on with comparative impunity. Notwithstanding the delays interposed by the defendants, we have from first to last done all that could be done under the existing condition of patent law to secure that 'final decision' to which the Advisory Committee refer. But do the Advisory Committee mean that the question should be fought to a finish, or do they mean to abandon the patent as their summary suggests? Further, supposing we secure that 'final decision,' and that it is in our favour, are we, then, to continue to proceed against infringers, or are we, as they advise, to engage in no further litigation, and allow the patent we have established to be infringed with impunity?"

On the point as to "commercial policy," we can congratulate Mr. Moeller on his continued advocacy of the cheapening of incandescent mantles; but when it is remembered that until a couple of years or so ago, the price still remained at 1s., and that it was not until three years ago that Mr. Moeller advocated their reduction to 9d., it seems to us that he is taking a little too much credit to himself in the following paragraph. The Advisory Committee "must surely know that the policy of reduction of prices was inaugurated not a year ago, but eight years ago, and that year by year, since 1893, the prices of mantles and burners were reduced, until in June, 1898, the mantles were brought down to 1s. In January, 1899, and again in September, 1899, I strongly advocated a further reduction to 9d., and pointed out that the price would ultimately have to be reduced to 6d. This is set out in my letter to the Board, dated Dec. 6, 1898, and in Mr. de Fonblanque's report to the Board (embodying and supporting my views) of Sept. 26, 1899. The Welsbach Board did not then think the time had come to make any further reductions in the prices; and, it would seem, under-estimated the extent of the infringement trade in the country. I always held that the earning power could only be maintained by a gradual reduction of prices, concurrently with an increased output of goods. This policy was uninterruptedly in force up to June, 1898; but from that time was abandoned until revived by Mr. Peters in June, 1900. Had it been adhered to during that interval of two years, a gradual reduction in prices would have increased the trade to a large extent, and would have maintained the earnings."

Speaking of the intention, at the time of the reconstruction, to subsequently bring into the combination the foreign Welsbach Companies, Mr. Moeller remarks that in such case the control of the Austrian Company (who supply the Welsbach Companies in Europe with fluid) would have been essential. "Had that combination been carried into effect, by reducing the prices of burners and mantles in France and other countries, a very increased demand for fluid would have resulted, and the income of the Austrian Company would have been maintained, notwithstanding reduction in the price of fluid. As it is, however, there is room for a large development of the fluid business; and the present decline of the Austrian profits need be only of a temporary nature. The relations between the [Austrian and English] Companies can still be put on a satisfactory footing."

Mr. Moeller deals next with the criticism of the Advisory Committee in connection with the Kern burner patent. It was early in 1897 that Mr. Moeller was shown the Kern burner; and he at once grasped the value of the invention, and secured the option of purchase. He makes the gloomy assertion that "had this valuable invention fallen into the hands of competitors," the business of the Company "would have been rendered practically valueless." Mr. Moeller may be asked to-morrow to explain the difference in the position of the business to-day and what it would have been if the Kern burner patents had not been purchased. According to the views of some people, the business is even now at the "practically valueless" stage.

We are rather surprised that Mr. Moeller supports the Directors in their opposition to a closer association with gas companies. What the Company have to fear from more intimate relations is a mystery which we are unequal to solving. However, upon this point we have had our say in the last two numbers, and so will let Mr. Moeller have his. It would indeed be a waste of space to devote criticism to such thin argument as we have here. Mr. Moeller writes: "It is only of late years that gas companies in this country have, to any appreciable extent, taken up the sale of lighting appliances; and, even now, only about a third of the gas companies are properly equipped for such a business. I can state, from my own experience, that the gas companies were opposed to the introduction of incandescent gas lighting in 1893 and 1894; and if they take an interest in it now, it is rather out of fear of the competition of electric lighting, than from any desire to push the best and most economical system of gas lighting. The business of the gas companies is to sell as much gas as possible. The Welsbach is to produce the maximum amount of light with the minimum amount of gas. The interests of the two are not, therefore, identical. If the Welsbach Company ceases to be foremost in providing the best gas economizers, it will lose the favour of the public; and it is the public, not the gas companies, that creates the revenue of the Welsbach shareholders. The Welsbach Company has always sought to co-operate with all the gas companies (not alone the 'great' ones); but it is far from the fact that the interests of the Welsbach Company and those of the gas companies are identical. The gas companies want to be at liberty to sell mantles and burners without any restriction as to retail price—*i.e.*, if we supply mantles to the gas companies and the trade at (say) 5d., gas companies wish to supply, if they choose, the public at the same price. The trade, however, must sell at a profit—they live by the profit made on such sales; while the gas companies, who have the big monopoly of the sale of gas, disregard the profit to be made on the sale of gas appliances. If the wishes of the gas companies in this respect were complied with, we would lose the custom of the ironmongers and gas-fitters, whose value as distributing agencies is of far more importance than that of the gas companies. One would have thought that this would have been obvious to anyone studying the question. To extend and popularize the use of incandescent gas-light appliances, it is necessary that the public should have facilities for their purchase. Such facilities are afforded by the trade; but if the public were required to go to the out-of-the-way offices of the gas companies every time a mantle or burner was needed, the demand for such articles would very soon decline. Had the Advisory Committee taken the ordinary precaution of ascertaining the views of the trade on this important point, they would not have been led into making a suggestion that has already caused a feeling of great uneasiness among our most valued customers. It is perhaps not known to the Advisory Committee that only 15 per cent. of our business is done with gas companies. While making every endeavour to secure the valuable co-operation of gas companies, our obvious duty is to encourage the trade, and to protect their interests in every single particular. It was through the trade that the business was built up when the gas companies would not look at our industry, and the support we then received we should not forget, even though our gratitude be but a sense of favours to come."

Before closing his remarks, Mr. Moeller explains that since 1890 he has been associated in the business of the Company with Mr. de Fonblanque; and the opinions here expressed he knows to be shared by him, whose intimate knowledge of the business of the Company has always been of the greatest assistance, and whose devotion to the shareholders' interests is deserving of a recognition it has not received.

LEEDS GAS WORKERS' DISPUTE.

The prospect of an agreement being come to between the Leeds Gas Committee and the stokers does not appear to have improved during the past week. Further friction has been caused by the statement made at the last meeting of the City Council by Alderman Lowden (*ante*, p. 40), to the effect that 246 men out of the 300 employed at the New Wortley works had signed a document agreeing to the terms proposed. The matter was dicussed at a mass meeting of gas workers last Sunday week, when several of the men stated that their signatures had been attached to the agreement without their knowledge or consent. It was mentioned that on the previous day the men received their week's wages without the increase of 4d. a shift, presumably because the offer made by the Gas Committee had not been accepted in its entirety. The whole situation was discussed; and the meeting was adjourned for a week. The men met again last Sunday, when the following resolution was adopted: "We, the men employed at the New Wortley gas-works, agree that the signatures attached to the petition were signed either by the men whose names appear on the list, or with their knowledge and consent; and we wish to add that we signed under the belief (as informed by the management) that it meant not working less than six shifts per week, otherwise we certainly would not have put our names to it." A proposition was moved and seconded in favour of sending in notices; but it was not put to the test of a vote. Eventually, it was decided to take a ballot of the whole of the men during the present week, to see if they will accept the Committee's offer subject to the minimum asked for (six shifts per week) being conceded.

MANCHESTER CORPORATION GAS SUPPLY.

Appointment of a Committee on the Allocation of Profits.

At the Meeting of the Manchester City Council last Wednesday, the minutes of the Gas Committee, which were adopted without discussion, included a resolution that, on the expiration of the existing contract on the 31st of March next, such spent oxide as is produced at the Rochdale Road and Bradford Road works during a period of twelve months ending March 31, 1903, shall be sold to the Manchester Oxide Company, Limited. Under this arrangement, the spent oxide will be sold at a certain price per unit of sulphur, *plus* a price for cyanides, in accordance with the quantity contained in the material; and the additional price obtained for the cyanides is expected to result in a saving of £300 a year, which amount would be lost to the Committee if their own spent oxide were burned for making acid. The Committee stated that they had acceded to the suggestion of the City Justices as to the desirability of applying the "double test" to all gas-meters, and had decided to ask the Justices to give instructions for this test to be applied as soon as practicable, at the Manchester Testing Office, to all meters intended to be fixed in the Committee's district of supply. Early intimation to this effect is to be given to meter makers doing business with the Gas Committee; and the additional fee for the application of this extra test is to be paid by the Committee. The Committee have further agreed to join the Sulphate of Ammonia Committee. In response to applications for a reduction in the price of gas for power purposes, the Committee have resolved to defer consideration of this question until the end of the financial year.

They have had under consideration a report by the Engineer (Mr. J. G. Newbigging) with respect to a proposal to light the streets round the three sides of the new Technical Schools in Whitworth Street with 27 lamps, each containing three burners, having a total illuminating power of 24,000 candles. It was recommended in the report that the lamps should be placed in Whitworth Street, Sackville Street, and Granby Row, at a distance of about 70 feet, and that a compressor, to give a pressure of 8 inches, should be fixed in the basement of the Technical School. "By these arrangements," it was added, "the streets will be magnificently lighted, and the building itself plainly seen at night, and an object-lesson will be provided as to the power of gas for street lighting. The Committee approved of these proposals, which were sanctioned by the Council; and the work will be carried out as speedily as possible by the Engineer and Mr. Waddington.

In addition to the minutes of the Committee, the Chairman (Alderman Gibson) brought forward the following motion: "That a small Committee be appointed to inquire and report upon the present method of allocating the profits of the gas undertaking, with the view of deciding whether such method is or is not in the interests of the ratepayers." He said his own belief was that the present method of allocating the gas profits was not to the real benefit of the parties named, and that was the reason why he asked the Council to appoint a Committee. The motion was seconded by Mr. Lambert, who observed that the suggestion contained in the motion was the only way of clearing up the question which Alderman Gibson had so much at heart, and which every member of the Gas Committee would like to be settled once for all. In any event, there would be no harm in appointing a Committee and getting a report. The motion was carried, and the Committee appointed.

BRISTOL GAS COMPANY'S OFFICIAL STOCK QUOTATION.

A question has recently arisen between the Bristol Gas Company and the Committee of the local Stock Exchange, which has resulted in the removal of the quotation of the Company's stocks from the official list. It appears that, previous to a sale by auction of stocks and debentures in the Company on Nov. 28 last, the Secretary (Mr. John Phillips) issued a circular to the proprietors, in which he stated that he would be pleased to bid for, and if possible purchase on behalf of, any proprietors of the Company desirous of increasing their holdings, but finding it inconvenient to personally attend. This circular offended the local Stock Exchange Committee, who, through their Hon. Secretary (Mr. Henry C. Perry), submitted to the Directors that it constituted an unfair competition with stock-brokers, who had hitherto been in the habit of executing such commissions, and asked for an assurance that such an action would not be resorted to in the future. The Directors have not so far felt justified in giving the required undertaking; and hence the disappearance of the Company's stocks from the official list. The following letter, addressed by Mr. Perry to the "Financial Times," with reference to a leaderette published by that paper on the subject, may be regarded as constituting the Committee's defence of this proceeding: "I may say the Committee recently had before them the action of the Directors of the Company in soliciting their shareholders to permit the Secretary of the Company to bid on behalf of would-be buyers of stock at the auctions which are periodically held. The Committee felt that as the law requires gas stock shall be submitted openly for sale by auction, and that for years past members of the Exchange have attended these sales upon the instructions of clients, it was an unfair competition with brokers, and, indeed, all other buyers, for the Secretary of the Company to be also acting as the agent for buyers; and the Committee look upon it as nothing less than a violation of the spirit of the Act of Parliament that the Directors should thus seek, through their Secretary's agency, to be buyers as well as sellers of the stock. The Committee requested me to write the Board asking for an assurance that such action would not be resorted to in the future; and as the Directors have not given such an assurance, the Committee have removed the quotations from the list—a course which is in general agreement with the feeling of the whole of the members of the Exchange, who are naturally unprepared to continue to advise their clients to deal in the stocks of a Company which seeks to adopt such a course." Mr. Perry in this communication has no doubt said all that he can say on behalf of the step his Committee have taken; but his statements seem to go a very little way indeed towards justifying their high handed conduct in the matter.

DEVONPORT GAS-WORKS TRANSFER.

Pending the award of the Arbitrator and the payment of the purchase money by the Corporation, the Devonport gas undertaking is being carried on by a Joint Committee, consisting of the Directors of the Company and the members of the Corporation Gas Committee. The Committee held its first meeting on Dec. 31, and decided that all liabilities falling due on or after the 1st inst. should be paid by the Corporation, who should also from that date take the receipts of the undertaking. The concern is therefore virtually being carried on for the profit of the Corporation. It is, however, understood that the present arrangement shall be carried out without prejudice to the Company or the Corporation in the event of the award making any different provision as to the assets or liabilities. As to the receipts prior to Jan. 1, the representatives of the Town Council stated their opinion to be that the Company were entitled to their dividends up to Dec. 31 (assuming those dividends to have been earned); and anything received by the Company over and above the amount required to pay such dividends, would be transferred to the Corporation as part of the assets. The question of the collection of the gas-rents was reported upon by the Manager and Secretary of the gas undertaking and the Borough Treasurer, and was referred to the Finance Committee for consideration of the possibility of consolidating this collection with that of the rates. The Gas Manager urged the absolute necessity of having new purifiers and condensers before next winter; and the Gas Committee decided that Mr. Corbet Woodall and Messrs. Stevenson and Burstal be asked for their respective terms for acting as Engineer for the proposed scheme of reconstruction of the gas-works, including the preparation of plans and supervision of the work. Another matter which is to be taken in hand is the extension of the mains in part of the outlying district to the boundary of the borough as recently enlarged. In a portion of this district oil-lamps have been placed since it came under the jurisdiction of the Corporation.

BURTON-ON-TRENT GAS SUPPLY.

Proposed Extension of the Gas-Works.

At the Meeting of the Burton-on-Trent Town Council last Wednesday, the Gas and Electric Light Committee presented a report in which reference was made to the proposed extension of the gas-works. In moving its adoption, Mr. Lloyd said it had probably been obvious to members of the Corporation who had noticed the statistical returns published in the *agenda* from month to month, that the quantity of gas consumed had been gradually on the ncrease for a considerable period—in fact, for a number of years. The Committee had, in consequence, to face the question of an extension of the works, so as to enable them to cope with this increase. In ten years the consumption of gas had gone up 50 per cent. Though the population had only increased in the ten years from 46,000 to 50,000 odd, they had had an increase in the same period of a million cubic feet of gas. This not only spoke well for the development of the town, but showed that the Committee had displayed some enterprise in connection with their undertaking. It had been suggested that the increase which had been going on would not be so marked in the future as in the past few years, on account of their having introduced penny-in-the-slot meters. These meters were being so rapidly put in that the time was coming when nearly every house in the borough would have a supply of gas. Hence they could not expect that the growth of the consumption would be so great in the future as it had been hitherto. It had been suggested that they should try to develop the lighting of the streets by electricity rather than extend the gas-works. Supposing they lighted by electricity the whole of the routes along which the tramways would run, it would only save 3 per cent. of the gas they used at present; so that it would not make any material difference. During the next few years, the increased demand for gas would necessitate enlargement of the works. The land connected with the present works was nearly all built upon. They suggested that Mr. George Livesey should be consulted on the matter, and Mr. Ramsden, their Engineer, quite approved of this. In many parts the works were getting old, and they proposed to ask Mr. Livesey's advice as to any future extensions they might have to make. They wanted to obtain the best possible opinion in good time, and not have to do the thing in a hurry. Alderman Turner seconded the motion, and it was carried.

GREENOCK CORPORATION GAS SUPPLY.

Suggested Extension of Inchgreen Gas-Works.

In accordance with the instructions of the Gas Committee, Mr. W. Ewing, Gas Engineer to the Greenock Corporation, has prepared a report on the schemes which he suggests should be carried out in order to utilize to the best advantage the plant at Inchgreen. The following are the details:—

	£	s	d
New coal-store and conveying machinery	4,325	0	0
Scheme No. 3 for the utilization of the existing retort-benches and stoking machinery, which included hot-coke conveyor and coke-handling plant	6,385	0	0
New Maxim carburettor and house	400	0	0
New 24-inch steel condensing main, with suitable controlling valves, connecting bye-passes, &c.	900	0	0
New rotary exhauster, engine, regulator, pipes and connections, &c.	520	0	0
New scrubber-washer and tar extractor, with engine, connections, valves, &c.	1,400	0	0
Purifiers, six 40 ft. by 30 ft., including valves and necessary connections, purifier-house, and lime-stores	11,109	0	0
Station meter of 150,000 cubic feet capacity per hour, 30-inch station governor, and 24-inch safety governor	2,874	0	0
Trunk main, 30-inch, cast iron, from Inchgreen to Cathcart Square	13,373	0	0
Scheme to remove existing sulphate of ammonia and tar-distilling plant to present purifier-house, with additions to plant, foundations, &c.	1,500	0	0
New workshops and tools	650	0	0
Re-arrangement of Crawford Street workshops	500	0	0
New weighbridges	320	0	0
Causewaying of cartways in works	500	0	0
Total probable cost of schemes recommended	£45,117	0	0

Mr. Ewing writes as follows under the heading of "Leakage or Unaccounted-for Gas": "The leakage or unaccounted-for gas in Greenock is about 12 per cent., which is excessively high compared with towns of similar size; but this can be partly accounted for by the small main-pipes and the high initial pressure required to force the gas through them. The maximum initial pressure is 6 inches, or fully seven times the pressure needed at the point of ignition for consuming gas with flat-flame burners. With the necessary trunk main pipe, &c., an initial pressure of 2 inches should be sufficient until the consumers are fully equipped with incandescent burners and fittings to consume gas under high pressures. Under ordinary circumstances, with ample area of main-pipes, systematic testing of meters, and minor improvements in service-pipes and fittings, it is quite possible to reduce the present leakage or unaccounted-for gas by 18 million cubic feet per annum. With these extensions carried out expeditiously, I am confident that the saving effected will be very considerable indeed, and I am persuaded would amply justify the capital expenditure which I have recommended in the foregoing report."

In his "General Remarks," Mr. Ewing points out that "with the existing main-pipes and services, there is a source of future danger in the electrolytic action due to the escape of the electricity from underground cables and tramway rails, which creates a rapid dredging action on iron, known as 'electrolysis.'" He understands that every care has been taken in laying the electric cables and tramway rails; but notwithstanding this fact, the risk of electrolyis is present, and may affect main-pipes and services, and thereby cause heavy escapes of gas in unexpected places. He remarks that several towns in England and America have had their main-pipes more or less affected by electrolysis; and this matter, which is imperfectly understood, is at present receiving the careful attention of several prominent gas engineers with a view to a means of protection. Owing to excessive pressure and too low pressure, there have been continual complaints from consumers in various parts of the town; and it has been found on examination that ground for complaint existed, due to one or other of these causes, or defective burners or fittings. Service-pipes are sometimes a source of complaint, owing to the formation of rust, which closes the area of the pipes and partly or wholly stops the supply. Burners unsuited to the quality of the gas are often a source of defective illuminating results.

Nantwich Water Supply.—The Nantwich Rural District Council have decided to apply to the Liverpool Corporation for power to tap their pipes at Egerton Green, and construct a main, at a cost of £6000, for supplying water to townships in the Council's district and for providing a reserve supply for Nantwich.

BILSTON GAS COMPANY.

The Annual Meeting of this Company was held on Monday of last week—Mr. Thomas Holcroft presiding. The Chairman, in moving the adoption of the report (which was noticed in the "JOURNAL" for the 31st ult., p. 1747), said there had been exceptional difficulties to contend with during the past year. Coal had risen 5s. a ton; and although the price of gas had been increased by 3d. per 1000 cubic feet, this had not more than half met the extra amount paid under that head. A reduction in the new coal contracts of 2s. 6d. a ton had been obtained; but part of the contracts at the higher rate were still running, so that the reduction would not fully come into operation for some time. It would therefore be impossible at present to lower the price of gas. The sum of £628 had been spent in opposing the Mond Gas Bill; and this had been charged to revenue account. It had been a great expense; and the only remedy in such cases that he could think of was that the matter should be brought before the local Members of Parliament, with a view to reducing the expense of opposing legislative measures of this kind. The profits on the year had not been sufficient to pay the usual dividend by about £790; but a proper use had been made of the surplus profits of previous years. With regard to the low selling price of coke, it was altogether out of proportion to that of coal. He was surprised that people did not use more coke, as a ton of coke would go as far as 1½ tons of coal. The report was adopted, and the dividends recommended were declared.

BIRKDALE GAS SUPPLY.

At the Meeting of the Birkdale Urban District Council last Tuesday, the Law Clerk (Mr. J. Smallshaw) read some correspondence which had passed between him and the Local Government Board on the quality of the gas supplied in the district. It appeared therefrom that the Clerk wrote to the Board on the subject on the 30th ult., and the only reply vouchsafed by them was to send a copy of a letter addressed to the Town Council of Southport on the 5th of April, 1897, conveying their decision on the application made by the Town Clerk in 1896 for a Provisional Order to amend the Local Acts of 1871 and 1876 on certain points connected with the gas supply. An inquiry, it may be remembered, was held at that time by General Crozier, R.E., who had before him the questions of the standard illuminating power of the gas, the method of testing it, and the maximum charge to be made. The Board went on to say they understood that at the inquiry the Corporation formally withdrew their application, so far as it affected the Birkdale urban district, and submitted a proposal that, while continuing to furnish gas of the same power as before within the urban district, they should be authorized to supply it of less illuminating power, and to make a proportionate reduction in charge, through the remainder of the limits. The Board said they were advised that the Local Acts contemplated that one quality of gas should be sent out to the entire district within the limits of supply, and that it was doubtful whether the Corporation were entitled to make a differential charge in Birkdale. The Board were also of opinion that it was undesirable that the Corporation should supply two qualities of gas; and, under these circumstances, they said they were not prepared to accede to the application of the Corporation in the form in which it was then made. Mr. Clinning said it appeared from the letters that the Corporation had no right to do so, but they exercised one, and charged 6d. per 1000 cubic feet more in Birkdale than in Southport, for the same gas; and, according to the test, it did not come up to the standard to which they were entitled by the Act of Parliament. He did not think the Local Government Board or any Government authority would grant them any reduction of the illuminating power so long as they could not produce the gas they were entitled to under their Act of Parliament.

GAS AND WATER PROFITS AT BARRY DOCK.

Local Government Board Inquiry.

At Barry Dock, last Thursday, Mr. E. P. Burd, one of the Inspectors of the Local Government Board, held an inquiry in regard to the application of the District Council for a Provisional Order to "partially repeal, alter, or amend the Barry and Cadoxton Local Board (Gas and Water) Act, 1893, so as to provide that the whole surplus revenue in any year of the gas and water undertakings not required for carrying them on, together with the annual proceeds of the reserve fund when such fund amounts to £5000, may be carried to the district fund." This is being done in order to meet the views of the Local Government Board Auditor (Mr. Cox), who has insisted that profits made on the manufacture and supply of gas shall not be utilized for the purpose of meeting the deficit on the water supply.

Mr. ANTON BERTRAM appeared for the Council; and Mr. DOWNING attended, in support of the application, on behalf of the Barry Railway Company and the Barry Graving Dock Company; while there were in opposition Mr. STEPHENSON, on behalf of the Llandaff and Dinas Powis Rural District Council, and Mr. T. CRAM and Mr. W. WILLIAMS, representing the Dinas Powis Parish Council.

Mr. BERTRAM, in presenting the Council's case, said the annual consumption of gas at Barry amounted to 110 millions, and it was supplied at the net price of 3s. 4½d. per 1000 cubic feet. By way of comparison, he might state that the price at Aberdare was 4s. to 4s. 3d. It was also desired that the Order should be made retrospective, so as to include the amount now standing in suspense. At Abertillery, it was provided in the Local Act that any surplus from the gas undertaking might be carried to the district fund.

The INSPECTOR: When your Bill was before Parliament, the Local Government Board suggested that this alteration should be made, and it was not done. You wish to apply profits made on gas in this way, but say nothing of profits on water, if you ever make any. Would it not be well to include the water also?

Mr. BERTRAM: Yes.

Alderman *Meggitt*, a member of the Council, was called, and, on being questioned about the matter mentioned by the Inspector, said the Council left these things largely in the hands of their Parliamentary Agents. At the time they had a long discussion with the Parliamentary Committee, and were more anxious to get the Act than to go into details. Unless the Order were granted, the effect would be to immediately increase the rate from 4d. to 6d. in the pound, and this would have a serious effect in preventing new industries springing up in the town.

In answer to Mr. DOWNING, witness said the imposition of a charge of 10s. a year on baths and 5s. a year on closets was abolished, but otherwise the Council maintained the maximum rates. The revenue lost through these causes amounted to £400 or £500 a year.

Mr. DOWNING: Do you not think the District Council might consider this again with a view to reimposing the charge.

Witness: I cannot speak for the Council; but for myself, I should say that rather than cause people to pay this 10s. I would prefer giving them 10s. to assist in getting a bath, and thus encourage cleanliness. I attach more importance to cleanliness than to the 10s. charge.

Mr. *C. B. Brown*, the Accountant of the department, and other witnesses having been called,

Mr. DOWNING said he regarded the practice of doing away with the tax on baths as a peculiar way of meeting the deficiency arising from the sale of water; for the reduction in the rates would be a greater inducement to manufacturers to come to the town than any lowering of the price of water for baths, or even the question of the cost of lighting, seeing that probably an electric power company would come into the district and supply light by an arrangement with the Council.

Mr. STEPHENSON asked that the outlying districts should not be charged more for gas and water than the area of the Council.

Mr. WILLIAMS and Mr. CRAM suggested that the outlying districts should participate in the profits.

The inquiry then closed.

HARWICH GAS PROVISIONAL ORDER.

The Town Council to Oppose.

At a Special Meeting of the Harwich Town Council last Thursday—the MAYOR (Alderman W. Groom) presiding—it was announced that a request had been received from the Harwich Gas Company for the assent of the Corporation to their application for a Provisional Order to enable them to erect works on the Bathside.

Mr. CANN stated that he had to present a petition, signed by nearly 200 residents and owners of property in Bathside, protesting against the proposal of the Company. When the application came before the Public Health Committee early last December, the draft Order was not placed before the Committee; and he pointed out that the Company were seeking powers to manufacture gas on their newly acquired land. It was owing to the contradiction of his statement, that the Public Health Committee assented to the application, and asked the Council to adopt their recommendation to the same effect. It was suggested that the Company were only desirous of building a holder; but since that Committee meeting the draft Order had been issued, and it appeared that it was the intention of the Company to obtain powers enabling them to manufacture gas on their recently purchased land at Bathside. He contended that it was a matter of either supporting a vested interest or the public interest; and, as a public body, it was their duty to oppose the Provisional Order. He noticed, too, by the plans, that the proposed gasholder was to be erected beyond the building line. The site was within 10 yards of one house; and within a radius of 50 or 60 yards of the site there were from forty to fifty houses, with a population of between 400 and 500. The inhabitants of Bathside were de ermined to defend their homes at all costs; and he urged that the grounds of their objection to the scheme should be that the works would decrease the value of property, and would be a nuisance and dangerous and injurious to the health of the inhabitants residing within a 300 yards' radius.

Alderman NALBOROUGH (remarking that he had never been a shareholder in the Company) said he was in a position to state that the Gas Company were willing to give an undertaking simply to use the site for storing gas, and not manufacture gas or store residual products.

Mr. GRAY asked, if that was the only intention of the Company, why it was they were applying for powers to do that which they did not intend to.

Alderman NALBOROUGH said he was assured that the Company had no idea of using these additional powers.

The TOWN CLERK suggested he should make an explanation.

Mr. CANN said he hoped the Town Clerk, who was a directly-interested party (being Solicitor to the Company) would adopt the same course as the Mayor, and take no part in the discussion. He objected to the Town Clerk saying anything. They did not want any explanations on behalf of the Company from their Solicitor. If they allowed it, it amounted to the Council having a conference with the Gas Company's representative.

The TOWN CLERK was eventually allowed to proceed with his explanation, and said he regretted his position; and had he dreamt it would have been a controversial matter, he would not have acted for the Gas Company. The clause relating to the manufacture of gas was put in to comply with the Act of Parliament; but it was not intended by the Company to take advantage of these powers. He admitted that such powers, if obtained, would enable the Company to manufacture gas.

Alderman NALBOROUGH: Notwithstanding the guarantee?

The TOWN CLERK: I do not say that.

Mr. APPLEBY pointed out that, even if a gasholder only were erected, the insurance of property would be increased. He had received an intimation from his agent to this effect.

After further discussion, it was decided that the Corporation should oppose the granting of the Provisional Order, in conjunction with the owners and residents of Bathside, and that the Solicitor acting for the latter should also represent the Council.

THE CRISIS IN BRITISH INDUSTRY.

"The Times" on Mr. Livesey's Views.

In the last number of the "JOURNAL" we gave the views of Mr. George Livesey on the above subject, as expressed in letters to "The Times." The following are extracts from a leading article thereon, which recently appeared in that paper :—

Most people, we imagine, will agree with Mr. Livesey when he says, in the interesting and fair-minded letter we published on Monday [Dec. 30], that there has been really no answer to the charges brought against Trade Union policy in the articles we have been publishing, for the simple reason that, unfortunately, they are too true. There is no getting over the cumulative effect of examples, adduced from a great variety of trades, showing deliberate and concerted action to limit output, to raise wages by methods which reduce the consideration given for the wages, to discourage and even to coerce men who would willingly give honest work, and to encourage all whose tendency is to skulk. More especially is this the case when we find that not only Trade Union leaders, but the theoretical writers who champion them, openly avow and preach as economic gospel principles which can issue in nothing but the abuses complained of.

How does it happen that Trade Unionism, which might have been a great power for good, has become a great power for evil? Why has it chosen the wrong road when the right path lay open and plain before it? Why has "the emancipation of labour," whatever that may mean, been sought by methods which threaten to emancipate it by leaving working men with nothing to do? Why has a cut-throat policy so taken possession of bodies of men, individually reasonable and endowed with many admirable qualities, that they are almost as ready to rend one another about some trumpery question of the delimitation of work as they are to ruin a capitalist in the effort to get what the market does not afford either to him or to them?

Mr. Livesey, it seems to us, comes remarkably near to a correct, though not, of course, a fully comprehensive, answer to these questions, when he says that the men have been accustomed for many generations to act under orders; that leaders are a necessity; that their natural leaders are their employers; that their employers have largely abdicated their functions; and that the place they have left vacant has been filled, as it always is in such cases, by people naturally unfit for the work. It is very much to the credit of the working men of this country that they are accustomed to demand leaders. For the vast majority of mankind the way to prosperity and happiness has always lain, and will always lie, in yielding willing obedience to good leaders. But the natural leaders and captains of industry in this country—what have they done for the rank and file? There are many exceptions, and they must regard themselves as excepted; but, taking the employers of this country as a body, can they be said to have fulfilled in any adequate manner the duties of industrial leadership? Have they taken any trouble to teach the industrial classes the things that it most concerns them to know? Certainly not, otherwise there would be no audience for the clap-trap of Trade Union leaders—again exceptions are excepted—or for the theories of sciolists who imagine vain things.

What do employers as a body make of their men? Do they discuss with them in a reasonable manner the things that concern masters and men alike? Do they make friends of their men, or help to clarify their ideas, or give them any leading which might supersede that of the wind-bags who compose the Trade Union Executive? Not much, and not often. But how far have the employers, as a body, taken pains even with themselves? How far have they made themselves deserving of the leadership of industry by their alertness and breadth of mind, by their openness to new ideas, by their appreciation of changing conditions, and by their self-denying application to work? The answer, we fear, cannot be too favourable, otherwise the flank of Trade Unionism would have been turned long before it reached its present development. Even now, with the whole set of the current against him, a strong, intelligent, and generous man can equip himself in spite of the Unions.

We had two remedies suggested on Monday—both depending on increased business intelligence among our employers. Mr. Livesey is in favour of profit-sharing, which he has introduced with marked success into the management of the South Metropolitan Gas Company. A very interesting letter from an engineering authority in the North of England, embodying his observations in America, which was quoted at length by our Correspondent, pointed to a system of premiums on good work. He finds that the American employer concedes a minimum wage, but couples with it a demand for minimum output. Mr. Livesey's plan is probably the best for his class of business. But that business is of a peculiar type. A gas company in this country has a monopoly of service in a certain district, and a power to avoid actual loss by raising its charges to the public. In ordinary manufacturing, there is always the possibility of a loss upon a year's working. Profit-sharing ought, therefore, to involve loss-sharing; and we do not know that anybody has really faced the problem thus constituted. Were the workmen to become substantially partners by taking a share of profit and paying a share of losses, they would very soon demand what it would logically be difficult to deny them—a voice in the management of the business. Thus we should drift back into that very struggle for mastery from which Mr. Livesey desires to escape. Therefore, while profit-sharing may work well in certain cases, we should say that, as a general rule, it would be found impracticable. When a master finds the capital, the plant, the connections, the brains, and the knowledge of the world required to carry on a business successfully, and when, in spite of all these things, he is liable to heavy losses, it would seem that a workman's interest in the prosperity of the concern is best secured by a system which pays him offhand for actual excess of effort above the standard. Such a system would no doubt be opposed by the present Trade Union leaders, just as they oppose profit-sharing. So far have things gone, that such opposition would practically have the assistance of many public bodies, at all events in certain important trades. But it could be carried through nevertheless, if not by the present masters, then by judicious combinations intelligently directed and capable of superseding them.

INCANDESCENT GAS v. ELECTRIC LIGHT AT REDHILL.

At a recent Meeting of the Redhill Corporation, the minutes of the Highways and Works Committee contained a resolution to adopt incandescent gas-burners in substitution for the existing ordinary ones throughout the borough; and this was agreed to. A discussion took place, on the same occasion, as to the lighting of a certain road with three incandescent lamps, in the course of which the Chairman of the Electric Lighting Committee (Mr. E. H. Burrage) tried to induce the Council to adopt the illuminant in the use of which he is interested. He pointed out that three arc lamps would be much cheaper than gas-lamps, and would not cost the ratepayers anything beyond the initial outlay for the posts and lamps. But the Council were not to be persuaded. In fact, one member said he considered the present arc lamps were a complete failure, and did not give so much light as the ordinary gas-lamps.

Mr. Burrage has since addressed a powerful appeal to the burgesses to use the electric light, which he highly extols. He acknowledges that the cost at present in the borough appears to be rather high; but he points out that, with an increasing use of the light, it will get gradually lower. Moreover, he says there is a right way of using it, as there is of other things, in which any would-be consumer can be instructed. A single lesson of five minutes' duration is all that is required; and carrying out the instructions gives no extra trouble at all. He concludes by assuring the burgesses that it is the earnest hope of those who are responsible for the management and success of the electric lighting scheme that they will "awaken to the advantages arising from the use of electricity, and calmly and dispassionately weigh the *pros* and *cons* of the subject, unbiassed by self-interested rumours to its detriment now in circulation." Above all, it is hoped they will realize that every additional consumer is equivalent to a step towards the reduction of the cost. With the light well taken up, "the burgesses will," he says, "be in possession of the cheapest and best illuminant obtainable, unrivalled for its brilliancy, safety, and true economy." This is what he will have to prove to the satisfaction of the consumers. The task will not be an easy one, in view of what Mr. Douglas Helps will be able to tell them on behalf of gas.

FATAL GAS EXPLOSION AT HYDE.

An explosion of gas occurred on the night of last Saturday week, at Slack Mills, Hyde, by which a man named Henry Brierley, in the employment of Messrs. J. & J. Braddock, lost his life. Deceased was engaged in putting a new drum in a gas-meter at the mills; and he had about finished his job, when he fancied that there was a leak somewhere. He asked a youth who was working with him if he had a match, as he wanted to ascertain whether there was any leakage; and soon after this the explosion occurred. The front of the meter was blown out; and a missile, supposed to be a piece of iron, struck Brierley on the head, fracturing his skull, and killing him immediately. The force of the explosion blew out all the windows of the place in which the man and youth were working. At the inquest, which was opened on the following Monday, Mr. Hawkyard, on behalf of Messrs Braddock, said the firm had been in existence for forty years, and had done dangerous work all over the country; but Brierley was the first person in their employ who had lost his life. Evidence of identification having been given, the Coroner stated that he would communicate with the Home Office, who might possibly require expert evidence taken. The inquiry was then adjourned for a fortnight.

FAILURE OF GAS AT HORWICH.

Report by the Bolton Gas Engineer.

Horwich was in a condition of semi-darkness on the night of Saturday, the 28th ult., and the tradespeople were compelled to use candles and other artificial illuminants. A Special Sub-Committee of the Gas and Lighting Committee of the Bolton Corporation met on the 3rd inst., to consider the complaints received in regard to the matter. One consumer made a claim in respect of loss; but the Committee repudiated liability. On the same occasion, the following report from the Gas Engineer (Mr. W. Smith) was read :—

On two or three occasions lately we have had complaints from the gas consumers of Horwich about a short supply of gas; and on Saturday, Dec. 28, 1901, the gas in many places either went out or nearly so. On the first occasion, when I was informed of the short supply and that the lights were unsteady, I sent men to examine the water-boxes or traps to see if they were all right. All the traps were found nearly empty and in good order, and for a fortnight all the lights at Horwich went on in their usual way.

A second time we had a complaint from our Mr. Bromley at Horwich that the lights were again bad. I again sent men to investigate, and try to find out where the defect was. At the same time I made inquiry of the mains foreman if there were any self-acting syphons on this main, and he informed me that there was one such syphon. I then instructed him to find out the position of this syphon, and to dig down and examine it. He was at this work on the 27th and 28th, but the 28th was so wet that the men had to leave off; and on that night, as above stated, the gas nearly went out. On Monday, the 30th, the men were again at work trying to find out the defect, and I visited them about 2 30 on that date. They had found the self acting syphon in a hollow.

When we bared our main, we found a 9-inch drain-pipe laid alongside ours; the top of this pipe being level with the top of our main. At this point, we found that the drain-pipe was jointed with clay, and right above our syphon. The water was running from the joint of the drain-pipe and getting into the main through the outlet of the syphon, and blocking the gas-way. This drain-pipe was laid right over the outlet of our syphon, so that we could not get at the syphon without

breaking out two lengths of the drain-pipe. Before breaking the drain, I called at the offices of the Horwich Local Authority. The Surveyor was out; but the Clerk gave me permission to break the drain. I did so, and found the bottom filled up about 5 inches with sand and dust from the road, and the top portion full of water; clearly showing that this drain did not fall to the outlet, but was lower at the point where our syphon was than it was at the outlet. I then had a 3-inch pipe laid from our syphon into the field about 5 feet from our main, and which is lower than the main. This self-acting syphon has worked well for the last 25 years, and, so far as I could see, would have worked well for another 25 years had it not been interfered with.

The whole trouble has been caused by the Horwich Local Authority laying this drain last summer in such an unsatisfactory and untradesmanlike manner. In the first place, the drain should have had a fall to the outlet; and, in the second place, all joints should have been made with cement. Had this been done, the water could not have got into our mains. When we bared our mains, we found water lying in the ground to within three inches of the top of our main; and when I bored the main, I found 5 inches of water lying in it. I may state that this drain is for surface water, and was laid last summer, and all short supplies of gas have been after heavy rains, when the water ran out of the drain-pipe into our syphon.

ELECTRIC LIGHTING NOTES.

Electric Light "Dangerous to Navigation."

At a recent meeting of the Tees Conservancy Commissioners, the Works Committee reported that complaints had been received from captains of vessels frequenting the port of Stockton, respecting the glare of the electric light on the Corporation wharf, which, it was alleged, was dangerous to navigation. The Stockton Corporation propose to put a black band upon the arc lamp globes, to see if this will remedy the matter.

Inquiry at Stockton.

The Stockton Corporation being desirous of borrowing £27,500 for electric lighting purposes, an inquiry was held last Friday, by Mr. R. H. Bicknell, on behalf of the Local Government Board. The amount was made up of £6500 excess spent over the previous loan, and £21,000 for extensions. The demand for electricity has proved greater than was originally anticipated; and the existing plant is barely sufficient for present requirements—much less to provide the necessary reserve, in case of a breakdown. From a statement made by the Town Clerk, it appeared that just before Christmas the town came very near being plunged in darkness, on the breaking down of one of the engines; and the situation was only saved by hurriedly bringing into use a new engine which had not yet been formally handed over to the Corporation by the contractors.

Extensions Necessary at Torquay.

After having been at a good deal of trouble to find a site for an electric lighting station, the Torquay Town Council are now threatened with the prospect of having to commence the search afresh, and provide an entirely new building. The present station is located in a portion of the building connected with the Bath Saloons. The place was altered and adapted for the purpose at considerable expense; but it has the disadvantage that its accommodation is limited, and cannot be extended. Electric tramway schemes have descended in a shower upon the town; and though the Corporation are not very enthusiastic on the subject, they have an eye to the revenue which may be obtained from the supply of current when the tramways are laid. At the meeting of the Town Council last Tuesday, attention was called to this phase of the matter; and the Council were urged to consider how such a demand was to be met. It was said to be absolutely impossible to find any more accommodation for machinery in the present station. In any event, the question of extension must soon be considered, for the demand for current has practically overtaken the means of supply.

Doncaster Inquiry.

Colonel Hepper, on behalf of the Local Government Board, held an inquiry at Doncaster last Wednesday into an application by the Town Council for power to borrow a further sum of £16,487 for electricity works. It was stated that the objects of the proposed loan were to make good the excess over what was estimated to be the expenditure when the Corporation applied for their first loan, for improvements effected during the construction of the works, and for further extensions. The excess over the original estimate amounted to £2214, and was owing to the great rise in the price of materials. The Town Clerk (Mr. T. Sugden) said that during the first year the earnings of the Electric Light Department were £1725, and the working expenses £1112, which left a surplus of £613 to meet interest and sinking fund, amounting to £1700. In October last, they started a new system of charging for current; and the Corporation decided to adopt a sliding-scale in order to encourage consumers. Gas was comparatively cheap, and was in the hands of the Corporation; so that they could not expect the demand for electricity to go up by leaps and bounds. On April 2, 1900, they started with a demand for energy equivalent to 3556 8-candle power lamps; and on the 6th inst., the demand was equal to 11,492 8-candle power lamps. Since then they had received further applications. The first loan obtained was for £29,240; so that the amount now asked for will bring the cost of the works up to £45,727. There was no opposition.

Louth Electric Light Scheme.

Reference has already been made in the "JOURNAL" to the scheme of electric lighting which the Corporation of Louth are applying to the Board of Trade for authority to carry out, and to the efforts of Mr. Joseph Store to prevent the town from embarking on an undertaking which he believes is likely to prove a serious burden, and which, moreover, is not required. Mr. Store confessed that he was largely interested in the Gas Company; but this did not detract from the value of the facts he laid before the ratepayers in the letters he addressed to them. His efforts were unsuccessful; and the Corporation gave the usual notice of their intention to go for a Provisional Order. Their progress, however, is not likely to be smooth, for the Gas Company have formulated a series of objections to the proposal, and submitted them to the Board. They point out that Louth is an agricultural market town with a declining population, and not adapted for electric lighting, owing to its want of compactness; while there is little, if any, scope for interior lighting, on the ground of expense as compared with gas and other illuminants. The present annual cost of the whole of the street lighting in Louth by gas does not exceed 4¼d. in the pound on the rateable value of the town; and the memorialists submit that the lighting could be made more effective than by electricity, without any increase in the present consumption of gas, by the adoption of the incandescent system. In the Directors' opinion, a municipal electricity undertaking in Louth would result in a deficit, and have to be subsidized out of the rates. The effect of this would be to increase the price of gas, as any augmentation of the rates must necessarily fall heavily upon the Gas Company's large assessment of more than £1200, and be felt by the Corporation and other consumers of gas, as well as, and to a greater extent than, by the shareholders of the Company under the sliding-scale. On account of this arrangement, there is every inducement to practical economy and good management in the working of the Company, and to supply gas at the lowest possible rate. In conclusion, the Directors strongly object to the precipitate action of the Town Council in this matter, and ask the Board, in the event of the application being proceeded with, to order a local inquiry to be held. The memorialists have given the Corporation some points upon which to satisfy the Board of Trade.

Penzance and the Cornwall Electric Power Bill.

Penzance has uttered the first note of alarm respecting the scheme of a Company who are promoting, under the title of the Cornwall Electric Power Bill, a measure which authorizes the distribution of electricity in bulk over a considerable area of the county. Why Penzance should be concerned, is not very clear, for there is no electric lighting undertaking in the town. It is true that the Corporation have been considering the question for some years, and that there is a kind of expectation that at some time Penzance, like other watering places, may be able to put up electric arc lights on its promenade. But as regards a not inconsiderable proportion of the members, the feeling in support of the scheme is certainly not enthusiastic. It was complained at a meeting of the Town Council on Wednesday, that out of 13 members constituting the Electricity Committee it is only possible to get an average attendance of five. Singularly enough, the gentleman who made this complaint put forward what seemed to be regarded as an excellent reason for postponing and delaying action in the matter—namely, that plant put down now at a cost of some £20,000 or £30,000 might be obsolete in ten years. He added that the principal aim of some members of the Committee had been to keep out a Company; and he expressed the opinion that it would be better to sink some money than do that. This was confirmed by another member, who said that the deputation who went on a tour of investigation to Plymouth, Torquay, and other places were everywhere advised not to part with their Provisional Order. The obvious reply was, of course, made, that to have an Order is not quite the same thing as to have the light, and that those who do want electric light would be glad if the Corporation would either provide it or retire from the field. The Committee are, therefore, going to consult Mr. Trentham, and see if he can help them to a decision on the subject. It is, perhaps, not impossible to anticipate what the decision is likely to be. There are, however, some members of the Penzance Town Council who are keeping an open mind on the subject. One of them pointed out at last week's meeting that, in view of the improvement in gas lighting, the question of the introduction of electric light was not so important as some people imagined; while another warned the Council that when they have got electricity they will probably find that nine-tenths of the ratepayers had to pay for the luxury of the other one-tenth. In the meantime, the Corporation will do what they can to keep out the promoters of the electricity-in-bulk scheme. In this they may or may not receive assistance from one or two other towns possessing Provisional Orders which they are in no hurry to carry out.

Electric Lighting Project for Romsey Rejected.

A largely-attended meeting, convened by the Mayor (the Right Hon. Evelyn Ashley), was held in the Council Chamber, Romsey, on Monday last week, to consider a proposal for the electric lighting of the town. The Mayor explained that at the last Council meeting he brought the question forward, and he had called the ratepayers together to hear two gentlemen who were present, and see if there was any chance of getting an electric lighting company for Romsey. The National Electric Wiring Company had large works at Swansea, and in other parts of the country. Mr. Cownie, the Secretary of the Company, then read a statement. He said the Company thought a capital of £7000 would be sufficient, and his Company would be prepared to find half this amount—£3500—and would require that the other half should be guaranteed by a legal gentleman. They would have a two-wire main with a continuous power of 200 volts. The estimated yearly revenue he put at £1115, and the working expenses at £570, leaving £545 for dividend. He thought he had put the outlay high and the income low. About £200 would be required for a Provisional Order. They would do all they could to make the Company a great success. The Mayor said that, as far as it went, the scheme was very clear. The capital would be £7000; the Company would raise half, and they wanted Romsey to raise the other half. The Company, which was a thoroughly solvent one, would guarantee 4 per cent.; and on this basis he held out to them a hope of 6 per cent. One of the most hopeful features was this—that the Company went to a man who had got gas and did not want the expense of putting in electric fittings, and offered to put in the installation and allow the payments to be spread over six years. Some questions having been put and answered, the Mayor moved a resolution as follows: "That this meeting approves generally of the scheme laid before it by the representatives of the Naticnal Electric

Wiring Company, and pledges itself to co-operate in putting in a more formal proposal that may be communicated to them in a prospectus for underwriting purposes, and by interviews with a selected Committee." After some discussion, the Mayor was asked whether, if the resolution was negatived, it would show that the meeting desired the Corporation to do the work; and he replied in the affirmative. The motion was then put, and only one hand was seen in the meeting to be held up for it; but a large number appeared against it. The Mayor asked for the vote again; and the same result being shown, his Worship said he was sorry he had brought the gentlemen down for such a result.

EXMOUTH WATER ARBITRATION.

It was stated in last week's issue that the award in the matter of the compulsory purchase of the undertaking of the Exmouth Water Company by the Exmouth Urban District Council had been received, but that it would not be made public until it had been taken up by the Council on payment of the costs, which amounted to £431. It has since been announced that the price the Council have to pay under the award is £67,533 in respect of the £28,000 of share capital, and £7000 in discharge of the debentures. Besides this, the Council are to defray the costs incurred by themselves and by the Company in regard to the Bill. In addition to fixing the value of the undertaking, the Arbitrators had before them the disputed charge of the Company to the Council for water used for street flushing, &c. The Company had increased this charge from £100 to £120 a year; and the award is that the Council shall pay at the rate of £110 per annum, and the costs of the arbitration. The total outlay on the part of the town is estimated at £90,000.

KINGSBRIDGE WATER SUPPLY.

Another and unexpected solution of the difficulty which has been experienced in providing a supply of water for Kingsbridge has apparently been discovered. For several years past the District Council have been considering the matter, and have had numerous schemes before them. Many of these have proved impracticable after much outlay in preliminary expenses; and the town, which has frequently been put to great inconvenience because of the failure of the present supplies in periods of prolonged drought, has had the mortification of seeing its money expended without obtaining any relief. Last session a Provisional Order was obtained for procuring a supply from Capton Moor, where it was proposed to acquire 8 acres of land and sink wells and drive adits for the purpose of intercepting the underwater. By this scheme, which was promoted on the advice of the late Mr. Santo Crimp, it was estimated that the supply of the town would be increased to 25 gallons per head, and that, if the necessity should arise, a quantity equal to 21 gallons for a population of 10,000 might be obtained. The cost was estimated at £10,000. It is now reported that the needs of the town may be supplied, at a much lower cost, from a source considerably nearer to Kingsbridge than Capton Moor. Mr. T. W. Lathom, the Surveyor to the Kingsbridge District Council, has been investigating the yield of certain springs from West Alvington Hill, which is in close proximity to the town. He finds that there is available a minimum of 27,000 gallons per day, which he proposes to collect in a tank and pump to a service reservoir 200 feet above sea level, from which all parts of the town could be supplied. The pumping would be done by means of an 8-horse power gas-engine; and the 27,000 gallons added to the existing supply would give an average of 20 gallons per head per day at the driest periods. Exclusive of the land and the gas-main, the cost of the scheme is estimated at £2400; and the annual outlay, including pumping, will, it is anticipated, be about £250. It is stated that the water is of good quality, though one of the members of the Council, when the matter was last under consideration, hinted at the possibility of pollution from the sewage of the village of West Alvington.

GUERNSEY WATER SUPPLY.

The "*requête*" on the above subject, to which reference was made in the "JOURNAL" for the 31st ult., was duly presented at the States meeting, and gave rise to an interesting discussion. Jurat F. B. Mainguy pointed out that the signatories represented three sections of the community—householders, growers, and the medical profession—who recognized the need of a properly organized water supply in connection with the new drains. He was supported by Messrs. Quick and Lee. Jurat Collings considered the Water Company had acted splendidly throughout; and the island owed a debt of gratitude to them. What would have happened but for their supply, irregular as it might have been, it was difficult to imagine. Still, a Committee, if appointed, could decide as to a better mode of supply in the future. Deputy Le Messurier spoke rather strongly against the States attempting to purchase the water-works, and argued that the matter should be left in the hands of the Company. By far the most sensible speaker was Deputy A. Marshall, who objected altogether to the "*requête*." Reviewing in a personal light the supply furnished by the Company, he said he could confidently assert that the want of a continuous good pressure had caused him to lose more money than the whole of the gentlemen whose names were appended to the document. The supply for domestic purposes could and would have been easily maintained if the Company had not to provide water for other purposes. But when, in the early days, the Directors had appealed to householders, they were poorly received; and in consequence of the limited number of domestic customers secured, they had perforce to appeal to the growers. The States could never afford a better supply, if domestic and trade water was furnished. The proposition was carried by 30 votes to 9.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 87.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 11	10½	Alliance & Dublin 10 p.c.	18—19	..	5 10 6
100,000	10	,,	7½	Do. 7 p.c.	13—14	..	5 7 2
300,000	100	Jan. 2	5	Australian 5 p.c. Deb. .	9)—10t*	..	4 19 0
200,000	5	Nov. 13	6¼	Bombay, Ltd. . . .	6¼—6⅜	..	4 16 4
40,000	5	,,	6¼	Do. New, £4 paid	4⅛—4⅜	..	5 9 5
380,000	Stk.	Aug. 15	12	Brentford Consolidated	265—270	..	4 8 11
270,000	,,	,,	9	Do. New . . .	192—197	..	4 11 5
50,000	,,	,,	5	Do. 5 p.c. Pref. .	130—135	..	3 14 1
206,250	,,	Dec. 13	4	Do. 4 p.c. Deb. .	112—115	..	3 9 7
220,000	Stk.	Sept. 12	10	Brighton & Hove Orig.	213—218	..	4 11 9
246,320	,,	,,	7	Do. A. Ord. Stk. .	150—155	..	4 10 4
420,000	20	Sept. 27	10	British.	41—42	..	4 15 3
50,000	10	Aug. 15	12	Bromley, Ord. 10 p.c. .	24—26	..	4 12 4
82,850	10	,,	9	Do. 7 p.c. . . .	19—21	..	4 5 8
500,000	10	Oct. 11	6	Buenos Ayres (New) Ltd.	9⅛—10	..	6 0 0
220,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	94—97*	..	4 2 6
150,000	20	July 17	8½	Cagliari, Ltd. . . .	22—24	..	6 17 6
100,000	10	Sept 27	10	Cape Town & Dis., Ltd.	14⅜—15⅜	..	6 9 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
550,000	Stk.	Oct. 11	12	Commercial Old Stock	265—270	..	4 8 11
236,425	,,	,,	9	Do. New do. .	203—208	..	4 6 7
238,237	,,	Dec. 13	4½	Do. 4½ p.c. Deb.	130—135	..	3 6 8
800,000	Stk.	,,	9	Continental Union, Ltd.	162—167	..	5 7 9
200,000	,,	,,	7	Do. 7 p.c. Pref.	160—165	..	4 4 10
575,000	Stk.	Aug. 29	5	Crystal Palace Ord. 5 p.c.	122—127	..	3 18 9
60,000	,,	,,	5	Do. 5 p.c. Pref.	123—128	..	3 18 2
486,090	10	July 17	10½	European, Ltd. . . .	19—20	..	5 5 0
354,060	10	,,	10½	Do. £7 10s. paid	14—15	..	5 5 0
15,079,885	Stk.	Aug. 15	4 1/16	Gas-light and Coke { 4 p.c. Ord. . .	97—99	..	4 8 10
2,600,000	,,	,,	3½	Gas-light and Coke { 3⅛ p.c. max. .	88—90	..	3 17 9
2,799,735	,,	,,	4	Gas-light and Coke { 4 p.c. Con. Pref.	111—114	..	3 10 2
4,063,425	,,	Dec. 13	3	Gas-light and Coke { 3 p.c. Con. Deb.	91—93	..	3 4 6
70,000	10	Nov. 13	8	Hongkong & China, Ltd.	13—14	..	5 14 4
3,800,000	Stk.	Nov. 13	10	Imperial Continental .	210—214	+1½	4 13 6
473,600	Stk.	Aug. 15	3½	Do. 3½ p.c. Deb. Red.	100—102	..	3 8 8
561,000	Stk.	Aug. 29	10	Liverpool United A .	232—234	..	4 5 6
718,100	,,	,,	7	Do. do. B .	170—173	..	4 0 11
306,083	,,	Dec. 30	4	Do. do. Deb. Stk.	117—118*	..	3 7 10
75,000	5	Dec. 13	4	Malta & Medn., Ltd. .	4½—5	..	4 0 0
560,000	100	Oct. 1	5	Met. of { 5 p.c. Deb.	106—110	+1½	4 10 11
250,000	100	,,	4½	Melbourne { 4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	Nov. 13	3½	Monte Video, Ltd. . .	9—10	..	7 0 0
1,515,892	Stk.	Aug. 9	4½	Newc'tle & G'tesh'd Con.	106—107	..	4 1 9
312,855	Stk.	Dec. 27	3½	Do. 3½ p.c. Deb.	98—102*	..	3 10 0
150,000	5	Nov. 28	8	Oriental, Ltd. . . .	7 1/16—8	..	5 0 0
135,000	5	,,	8	Do. New, £4 10s. pd.	6¾—7¼	..	4 19 4
15,000	5	,,	8	Do. do. 1879, £1 pd.	1¼—1⅜	..	4 11 5
60,000	5	Sept. 27	7	Ottoman, Ltd. . . .	5¾—6¼	..	5 12 0

* Ex. div.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
851,070	10	Oct. 11	7	River Plate Ord. . .	10—10⅛	..	6 13 4
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb..	94—97*	..	4 2 6
250,000	10	Sept. 27	8	San Paulo, Ltd.. . .	11—12	..	6 13 4
135,000	Stk.	Sept. 12	10	Sheffield A	242—244	..	4 2 0
209,984	,,	,,	10	Do. B	241—243	..	4 2 4
523,498	,,	,,	10	Do. C	241—243	..	4 2 4
5,761,885	Stk.	Aug. 15	5	South Met., 4 p.c. Ord.	124—126	+1	3 19 4
1,627,965	,,	July 17	3	Do. 3 p.c. Deb. . .	92—94	..	3 3 10
380,940	Stk.	Nov. 13	5	Southampton Ord. . .	102—106	..	4 14 4
70,825	,,	July 17	4	Do. 4 p.c. Deb.	104—109	..	3 13 5
120,000	Stk.	Aug. 29	5½	Tottenham and Edmonton { A. 5 p.c. B. 5½ p.c.	122—127	..	4 6 8
250,520	,,	,,	4		95—100	..	4 0 0
182,380	10	Jan. 16	5	Tuscan, Ltd.. . . .	7⅓—8¼	..	5 17 8
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	95—96*	..	5 2 0
230,000	5	Aug. 15	9	West Ham, 10 p.c. . .	9⅜—10⅜	..	4 5 9
172,000	10	,,	6	Do. 7 p.c. . .	12⅜—13⅜	..	4 8 11
140,900	Stk.	Dec. 30	4	Do. 4 p.c. Deb	105—110*	..	3 12 9
				WATER COMPANIES.			
780,599	Stk.	Dec. 30	11⅛	Chelsea, Ord. . .	315—320*	+2½	3 11 11
150,000	,,	,,	5	Do. 5 p.c. Pref. .	150—155*	..	3 4 6
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	138—143*	..	3 2 11
175,785	,,	Sept. 27	4½	Do. 4½ p.c. Deb. .	140—145	..	3 2 1
1,720,560	Stk.	Oct. 11	7	East London, Ord.. .	197—202	−1	3 9 4
654,740	,,	Dec. 13	4½	Do. 4½ p.c. Deb. .	140—145	..	3 2 1
1,018,046	,,	,,	3	Do. 3 p.c. Deb. .	96—98	+1	3 1 3
700,000	50	Dec. 13	8	Grand Junction { 10 p.c. max.. 4 p.c. Deb..	113—116	..	3 9 0
310,000	Stk.	Sept. 27	4		122—126	..	3 3 6
708,000	Stk.	Aug. 15	14	Kent	300—305	..	4 11 10
160,000	,,	,,	7	Do. New, 7 p.c. max..	200—205	..	3 8 4
1,043,800	100	Dec. 30	10½	Lambeth, 10 p.c. max..	293—298*	..	3 10 6
406,200	100	,,	8	Do. 7½ p.c. max..	217—222*	..	3 12 1
350,000	Stk.	Sept. 27	4	Do. 4 p.c. Deb..	125—130	..	3 1 7
500,000	100	Aug. 15	12 5/10	New River, New Shares	395—405	..	3 3 2
1,000,000	Stk.	July 31	4	Do. 4 p.c. Deb..	125—130	..	3 1 7
902,300	Stk.	Dec. 13	7	South-wark and Vauxhall { Ord. . . . 7½ p.c. max. 5 p.c. Pref. . 4 p.c. A Deb.	193—198	..	3 10 8
126,500	100	,,	7		183—188	..	3 14 6
489,200	Stk.	,,	5		150—155	..	3 4 6
1,019,585	,,	Oct. 11	4		124—129	..	3 2 0
1,155,066	Stk.	Dec. 13	10	West Middlesex. . .	280—290	..	3 9 0
200,000	,,	,,	4½	Do. 4½ p.c. Deb. .	137—142	..	3 3 5
200,000	,,	Sept 12	3	Do. 3 p.c. Deb. .	96—98	..	3 1 3

* Ex. div.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

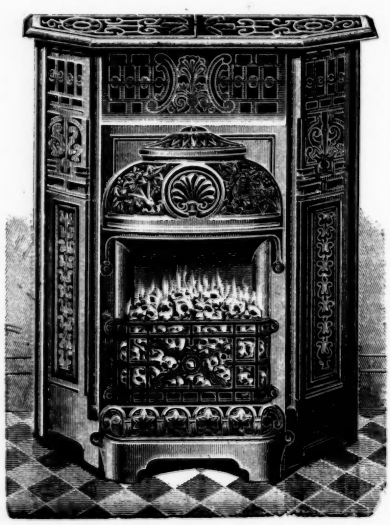
The Corporation of Aberdeen on Monday discussed the subject of Sunday labour in the gas-works. The Gas and Electric Lighting Committee reported that they had considered the application of the employees, through the National Union of Gas Workers and General Labourers, to be paid at the rate of time-and-a-half for Sunday work, and that they were of opinion that there had been no change of circumstances which would warrant them in recommending any increase at present; but inquiry is being made for the purpose of ascertaining whether Sunday labour can be reduced, and, if so, to what extent.

Mr. Kemp, the Convener of the Committee, moved the adoption of the report. He said the Council, as well as the Committee, had repeatedly declared that any increase in pay among the gas workers in the present condition of things in the city was quite uncalled for, and could not be entertained. In these circumstances, the persistency of the demand was not very intelligible to the uninitiated; but the Committee were quite satisfied that the Council had done the only proper and wise thing open to them. This determination was no doubt very annoying to those who wished to exploit the Council in other interests than those of the general body of gas consumers; but the Council dare not pander to sectional interests, as against their duty to the community generally. The Council had an opportunity, when dealing with the budget proposals for the current year, of granting an increase in wages by raising the price of gas; but this they very properly declined to do. The present application was the same as was dealt with by the Corporation then; and there being no change of circumstances—or, rather, any change which there had been being the reverse of favourable to the application—there could only be one answer. But it was said that the case of the men had been entirely misrepresented. They were left in no doubt as to what was meant by this expression, because a circular had been sent to the members of the Council. That circular was doubtless sent for the purpose of inducing the members of Council to think that the Committee were misleading them, either by mis-statements of facts or otherwise. Of course, as the spokesman of the Committee, he was regarded as the villain of the piece; and he was said to play the part to the life. His alleged fault was that, in presenting the Committee's report, he stated that there was a time when Sunday labour did not exist in the gas-works, and that the shutting down on Sunday was stopped at the request of the men themselves. It had been said by the spokesman of the portion of the men who belonged to the Union that this was "a very unfair and misleading statement," which there was "no truth in whatever." He was no authority on the subject, and had no personal knowledge of it, not having been in the Council at the time; but the Committee's information, as well as his own, was taken from the printed minutes of the Council—quite good enough proof, he should think, to any open-minded man. So recently as Dec. 3, 1900, the Gas Manager reported that "no gas-works of any size in Scotland have entirely abolished Sunday labour. Some have been obliged to shut down on Sundays for a few hours, but only because of deficient storage capacity. This was tried in Aberdeen in 1888, but was found to be unsatisfactory, both to the undertaking and to the workmen; and at the request of the workmen themselves, the attempt was abandoned." This, surely, was explicit enough; but he had since satisfied himself, from other sources, apart from the mere record, that the statement was true. In 1872, the duration of the shift was reduced from twelve to eight hours, and the total from 84 to 56 hours per week; and it was intended to arrange the shifts so that every man would have a clear Sunday of 24 hours every third week. In June, 1894, the men petitioned, and the Committee granted, a clear Saturday instead of a clear Sunday. According to the minutes, in every instance any changes which were made in relation to Sunday labour were made at the request of the men themselves; and members of the Committee who could speak from personal knowledge stated that in every instance in which the men's pay was being considered, the fact that one of their eight-hour shifts had to be worked on Sunday was kept clearly in view, and the rate adjusted accordingly. It was rather too much of a good thing for the men to get their Sunday labour arranged from time to time to suit themselves, and now to demand time and-a-half for having their own way. It was quite evident that, but for Sunday labour being included, the pay would certainly not be what it was to day. He need hardly remind the Council that there was no equity in comparing what was paid in Aberdeen with what was paid in other large towns in Scotland, because, as had been shown, there was no greater disparity between the wages of gas workers there and elsewhere than there was between the wages paid in the building trades and to iron workers there and elsewhere. When wages in those trades were raised to the standard in other towns, he had not the slightest doubt but that the Council would at once place the gas workers alongside their fellow workmen elsewhere. Until this came about, it would be manifestly unjust to artizans generally in Aberdeen to raise their gas bills in order to place unskilled labour at the gas-works in a better position than they were in themselves. The Council having deliberately refused to include any rise of that character when dealing with the estimates, could not honourably do so now, and still less could they do so when another Committee were that day actually advising them to reduce the wages in another department.

Mr. James Gray moved that the application be granted. All he wanted was fair play; and he did not think it was fair play to ask men to work on Sunday for the same pay as during the week. The purifier and shed men were already paid time-and-a-quarter; and why should they refuse an increase to the men who were sweltering in the heat? He had been more than nine years in the Council, and he never saw a Committee wobble as this had done upon the present question. Time and again the Committee had brought up milk-and-water reports on the matter. He did not want his gas made cheaply at the expense of the men who worked on Sundays; and he believed that the whole 18,000 consumers did not wish the price of their gas reduced in order that the men might be done out of their Sunday.

Wright's "EUREKA" Gas-Fires.

The . . . 'Chancellor' Nursery Fire. . .



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Mr. Wishart said the subject had been brought forward three times; and there was no combination of employers who would, in the circumstances, treat their people as the Committee proposed to treat the men at the gas-works. The principle involved in extra payment for Sunday labour was one the Council should homologate and endeavour to carry out to the best of their ability. They should make it more expensive, if possible, for Sunday labour to go on. If the men were paid too much already, then reduce their wages for ordinary days, and pay them time-and-a-half for Sunday labour. Mr. Cooper, while not wishing to make any threat, assured the Council that the Union to which the men belonged was a strong one; and if they exercised the power at their back, the consequences would be serious for the city.

The recommendation of the Committee was adopted by 19 votes to 14. This should surely set the matter at rest for some time. I suppose Aberdeen is selected as the theatre for the persistent appeals on behalf of the Union, because Socialistic doctrines are widely held in the community.

It is reported to-day that another collapse has taken place of part of the pipe-track of the new Talla scheme of the Edinburgh Water Trust. A trench of a depth of from 35 to 40 feet, which has been standing open, with timbered sides, has, it is stated, fallen in. This misfortune will occasion considerable delay in finishing the work.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Jan.* 11.

Sulphate of Ammonia.

The improved demand at date of last report developed into considerable activity, and during the week a good business has been done at all points at advancing prices. The closing quotations are £11 per ton f.o.b. Hull, £11 3s. 9d. per ton f.o.b. Liverpool, and £11 5s. per ton f.o.b. Leith. For delivery ahead, there has also been improvement, but not to the same extent as in the spot market, there not having been any serious depression in December. London delivery, Beckton terms, has been sold at £11 5s. per ton, over the spring months; and £11 7s. 6d. is now asked. £11 7s. 6d. is also required f.o.b. Leith, ordinary terms, over the same period.

Nitrate of Soda.

This is again firmer, and 9s. 9d. per cwt. is the quotation for fine quality on spot.

LONDON, *Jan.* 11.

Tar Products.

There is nothing special to advise as regards the markets. Pitch continues very firm, especially for prompt shipment from London; but it is impossible to secure supplies from the makers. Business is reported in the North all over the present year, but at prices considerably lower than those ruling for prompt delivery. 90 per cent. benzol is easier, and 10½d. has been accepted for January-March in more than one instance at outports. 50-90 per cent. is very dull. One or two sales were made at 9⅜d., January-June; but consumers now offer only 9d. over this period. Creosote continues very firm; and the prices now being realized are decidedly better than was recently the case. The large quantities lately taken off the market by the railway companies have no doubt something to do with the improvement in value. Carbolic is very quiet. Business has been done at 1s. 10½d. for 60's, January-June. 50's, however, continue fairly steady, and sales are reported at 1s. 8d. f.o.b. It is difficult to understand the improvement in this quality, seeing the depression that prevails in liquid carbolic. Crystals remain quiet. The only demand is for 34-45's. The price, however, is unchanged. Several small tar contracts have been let, at prices varying according to the situation.

The average values obtaining during the week are: Tar, 15s. to 18s.; Pitch, east coast, 35s. 6d. to 36s. 6d.; London, 37s. 6d. to 38s.; west coast, 34s. to 34s. 6d. Benzol, 90's, 10½d. to 10⅝d.; 50's, 9d. to 9½d. Toluol, 10d. Crude naphtha, 4¼d.; solvent naphtha, 11d.; heavy naphtha, 10d. Creosote, North, 1⅛d.; London, 1⅞d. Heavy oils, 2⅛d. to 2¼d. Carbolic acid, 60's, 1s. 10½d. Naphthalene, 60s. to 75s.; salts, 30s. to 45s. Anthracene, "A" quality, 2d. to 2¼d.; "B," 1d. to 1¼d.

Sulphate of Ammonia.

There is a decidedly better inquiry; and it seems clear that the Continental demand has improved considerably. Beckton remains firm at £11 7s. 6d., having declined £11 5s. in any position. Another of the large London Companies have, however, accepted £11 5s. for a certain quantity, early shipment, but declined to continue selling at the same figure. In Hull, business has been done at £11 for ordinary makes; but £11 1s. 3d. to £11 2s. 6d. has been paid for special qualities. Leith is very firm. Business has been done at £11 3s. 9d.; and some sales are reported at £11 5s. Makers do not appear anxious to sell for forward delivery, and are reported, in some instances, to have declined £11 5s. for January-June. As regards Liverpool, prices do not show quite so much improvement; but at the same time there is a fairly good demand, especially for prompt shipment.

COAL TRADE REPORTS.

Lancashire Coal Trade.

For the better qualities of round coal there is a falling off in the demand; but as collieries have still mostly arrears of orders on their books, all that the pits are raising is moving away freely, and a strong, steady tone is maintained as regards prices. For house-fire descriptions, the quoted list rates are firm at 15s. 6d. per ton at the pit for best Wigan Arley, 13s. 6d. for Pemberton four-feet and seconds Arley, and 11s. 6d. for common house coal. In the lower qualities of round coal, there are indications of some improvement as compared with two or three months back; and here and there on special contracts collieries are holding out for quite 6d. per ton more

CARBURETTED WATER-GAS APPARATUS

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WINDSOR ST. WORKS, BIRMINGHAM	2,000,000
SALTLEY WORKS, BIRMINGHAM	2,000,000
COLCHESTER	300,000
BIRKENHEAD	2,250,000
SWINDON (New Swindon Gas Co.)	120,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000
HALIFAX	1,000,000
TORONTO	250,000
OTTAWA	250,000
LINDSAY (Remodelled)	125,000
MONTREAL	500,000
TORONTO (Second Contract; Remodelled)	2,000,000
BELLEVILLE	250 000
OTTAWA (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000
ST. CATHERINES (Remodelled)	250,000
KINGSTON, PA.	125,000
PETERBOROUGH, ONT.	250,000
WILKESBARRE, PA.	750,000
ST. CATHERINES (Second Contract)	250 000
BUFFALO, N.Y.	2,000,000
WINNIPEG, MAN.	500,000
COLCHESTER (Second Contract)	300,000
YORK	750,000
ROCHESTER	500,000
KINGSTON, ONT.	300,000
CRYSTAL PALACE DISTRICT	2,000,000
DULUTH, MINN.	300,000
CATERHAM	150,000
LEICESTER	2,000,000
ENSCHEDE (HOLLAND)	150,000
BUENOS AYRES (RIVER PLATE CO.)	700,000
BURNLEY	1,500,000
KINGSTON-ON-THAMES	1,750,000
ACCRINGTON	500,000
TONBRIDGE	300,000
STRETFORD	500,000
OLDBURY	300,000
TODMORDEN	500,000
SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
YORK (Second Contract)	750,000
ROCHESTER (Second Contract)	500,000
NEWPORT (MON.)	250,000
TOKIO, JAPAN	1,000,000

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SMETHWICK . . . 500,000 Cubic Feet.
MALTON . . . 150,000 Cubic Feet.
GRAVESEND . . . 300,000 Cubic Feet.

than they would have been willing to accept during the autumn of last year. This, however, scarcely affects the general quoted rates, which, for steam and forge qualities, remain steady at 9s. to 9s. 6d. per ton at the pit. All the better sorts of engine fuel still meet with a ready sale; and local collieries in many cases are short of supplies in the best qualities of slack. The commoner sorts are still fairly plentiful on the market, and are to be bought at low figures from other districts. Lancashire prices are firm up to 7s. and 7s. 6d. per ton for best slack, and 5s. 6d. to 6s. for the commoner sorts. The shipping trade continues fairly active, and slightly better prices have been maintained—10s. 6d. to 11s. per ton being readily secured for good qualities of steam coal, delivered at the ports on the Mersey. Coke is in fairly good demand, with prices unchanged; quotations at the ovens remaining at 22s. to 24s. per ton for best Lancashire foundry qualities, and 13s. to 14s. for good washed furnace cokes.

Northern Coal Trade.

There is a full demand for coal; but there is not the pressure that there was before the turn of the year, and prices are now easier than they were. In the steam coal trade, best Northumbrian steams are easier at about 11s. 3d. to 11s. 6d. per ton f.o.b., unscreened steams about 9s. 6d., and steam smalls 5s. 6d. to 5s. 9d. The collieries have work enough for this month; but there are not so many future orders yet placed—partly owing to the uncertainty as to the tax, which deters trade. In the gas coal trade, occasional cargoes are firm in price; but for contracts, there are lower quotations. For best Durham gas coals, about 12s. per ton f.o.b. is quoted for prompt delivery; but for contracts over the shipping season, about 9s. 9d. to 10s. per ton is the price that is most generally asked. But it is to be remembered that the big contracts are usually given to one or two collieries producing the best classes of Durham gas coals. The tendency of the price will not be so well told by this as by later contracts, in which there may be more competition. The coke trade is rather quieter, this being the season of the smallest exports. Best Durham coke for export is about 18s. per ton f.o.b., and blast-furnace coke is steady at 16s. 9d. to 17s. per ton free at the Teesside blast-furnaces. Gas coke is very plentiful; but the stocks do not seem to be generally excessive. Prices vary a little more than they did; for though 12s. 9d. per ton f.o.b. is named by some as the figure, yet there are buyers who claim that they can purchase at 9d. to 1s. per ton below this rate.

Scotch Coal Trade.

Scarcely any orders have been placed; and of those which have been, prices cannot be said to have varied. There is almost no forward trade at present; so that there is abundance of room for development when the disturbance caused by the coal tax has been removed. The prices quoted are: Main 9s. to 9s. 3d. per ton f.o.b. Glasgow, ell 10s. 3d. to 11s. 3d., and splint 11s. 3d. to 11s. 6d. The shipments for the week amounted to 85,788 tons—showing a decrease upon the previous week of 128,323 tons, but an increase upon the corresponding week of last year of 8225 tons.

Extensions at the Nelson Gas-Works.—At the last meeting of the Nelson Town Council, the minutes of the Gas Committee contained a resolution to the effect that application should be made to the Local Government Board for sanction to borrow a sum of £23,000 for gas-works extensions. Alderman Wilkinson said that £4000 would be allocated to the retort-house, where four more beds were needed; £4000 to the provision of a sulphate-works; £1000 to the boiler-house and new tools; £4000 to a new coal-pit and meters; and another £4000 to the mains in Brierfield and Nelson. With these additions, the Committee expected that the requirements of the district for the next three or four years could be met. The minutes were approved.

Divination for Water.—A considerable amount of interest was caused in the Towcester district by some water-finding experiments conducted last Tuesday afternoon at Littleworth House, near Greensnorton. The services of a "dowser" were engaged, and a spring was said by him to exist, at a depth of some 50 feet, about 10 yards from the house. Farther away the main spring was alleged to be discovered some 30 yards from the house, at a depth which was estimated at 40 feet, and its course was followed for a short distance. Within 15 yards of this spot, a waterless well, 120 feet in depth, has existed for some time. This, however, is to be explained by the fact that the lower parts of the well are in the blue clay, which is practically impervious to water.

Brynmawr Water Scheme.—On Wednesday last, a special meeting of the Brynmawr District Council was held to consider the amended proposal of Messrs. Haller and Machell. The estimate for the first scheme of water supply was £14,531. The Council thought this figure too high, and decided that an estimate not exceeding £8000 be prepared. A Local Government Board inquiry was held on the strength of the application for power to borrow this amount, with the result that the Board suggested several alterations and improvements; and the Engineers were instructed to prepare another scheme to include these suggestions. This scheme is now under consideration, and is estimated to cost £11,699. Several members said they could not vote for it without first appealing to the ratepayers. It was ultimately decided to consider the matter at an early date in Committee.

A Dry Year in Birmingham.—Unusual dryness characterized last year in Birmingham. The rainfall was 24·38 inches at Whitacre, near the reservoir, compared with 33·02 inches in 1900—a reduction of 9 inches. Witton fared slightly better—receiving 22·58 inches; but even this was a falling off of 7 inches compared with 1900. This marked reduction would in some circumstances have had a most serious effect upon the water supply of the city; but happily the fall was pretty evenly distributed over the whole twelve months. Heavy rains benefit the Water Department but little, because so much of the water runs to waste. The total storage in the reservoir at the end of the year was 517 million gallons, compared with 540 millions at the end of 1900. The number of houses in supply at the close of 1901 was 158,603, against 154,648 at the end of the previous year—an increase of nearly 4000. Allowing five persons to each house, there were 20,000 more people being supplied.

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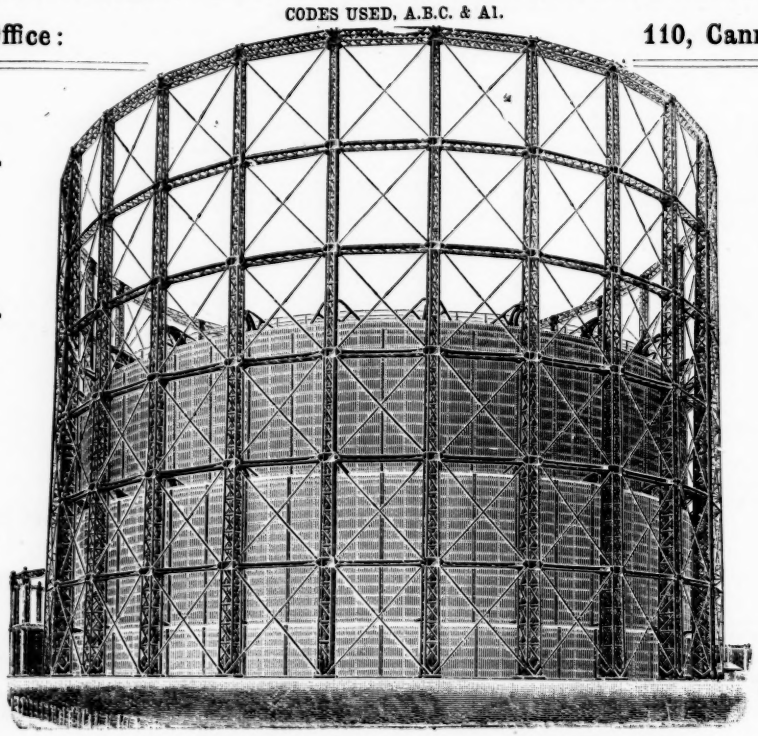

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RETORT-MOUTHPIECES.
SLIDE-VALVES, TAR-BURNERS, SIEVES.

Lighting Private Streets.—The report of the General Works and Highways Committee of the Nottingham Corporation on this subject (which was noticed in last week's "JOURNAL," p. 42), was introduced by Sir John Turney at the meeting of the City Council on the 6th inst., and adopted after a short discussion.

Wages and Hours at the Southport Gas-Works.—The Southport Corporation Gas Committee have decided that in future the foremen, the boiler stokers, and exhauster men should work eight hours instead of twelve hours per day; and that the wages should be fixed as follows: One foreman, 42s. instead of 46s. per week; two foremen, 42s. instead of 45s.; boiler stokers, 28s. instead of 32s.; exhauster men, 30s. instead of 34s. It has been further decided that the men in the sulphate-house, while actually making sulphate, should receive a bonus of 2s. per week.

Elland District Council and the Gas-Works.—As stated in our issue of Nov. 19 last, the Elland Urban District Council decided to write asking the Gas Company if they were willing to sell their undertaking. Mr. Robert Porter, the Engineer and Manager of the Company, now intimates that he has been instructed by his Directors to reply that they are not prepared to dispose of the concern. It is stated that the other local authorities interested are not inclined to join the Elland Council in their endeavour to purchase the works. It is considered by many to be too expensive an undertaking for the Council to embark upon—particularly in view of the fact that they themselves are taking steps to introduce electricity.

Reductions in Price.—At their meeting on Monday of last week, the Burslem Town Council agreed to reduce the price of gas, as from the March quarter, by 2d. per 1000 cubic feet; another 1d. reduction to be allowed to consumers using over 50,000 and under 100,000 cubic feet in any quarter, and a further 2d. to those taking over 100,000 cubic feet. It was also decided that the present allowance of 2d. per 1000 cubic feet on gas used for power purposes be continued; and that all the allowances should be in addition to the usual discount for payment within one month. The Directors of the Seaham Harbour Gas Company have decided to reduce the price of gas by 2d. per 1000 cubic feet. The Ballymena and Harryville Company have reduced the price of gas from 5s. to 4s. 7d. per 1000 cubic feet as from the 1st inst.

Cirencester Gas Provisional Order.—At a special meeting of the Cirencester Urban District Council last Tuesday, it was agreed that a letter should be addressed to the Board of Trade objecting to the application of the Gas Company for a further Provisional Order, upon the grounds that the amount of the additional capital proposed to be raised appeared to be excessive, and that the Company were not entitled to create a reserve of £2000, having regard to the provisions of the Order of 1901 and the price which had been charged for gas. It was also pointed out that no sum had been written off in respect of depreciation of plant, &c., which should be done, as otherwise the amount appearing in the balance-sheet under the heading of "works" was misleading, and might at some future time be prejudicial to the interests of the ratepayers.

Keith Compressed Gas Lighting at Oldham.—In front of the Town Hall, Oldham, there is now in operation an installation by the James Keith and Blackman Company, of their system of high-pressure incandescent gas lighting. The compressed gas is led to six hexagonal lanterns placed on two pillars. In each lantern there are three high-pressure burners, arranged to pass 10 cubic feet of gas per hour. They are fitted with mantles, and each cluster gives a light of 1000 candles; the cost of the whole being 5d. per hour.

Gas from the Californian Oil Fields.—An undertaking has recently been registered under the title of the Californian Gas and Electric Company, with a capital of $30,000,000, to supply gas for lighting and fuel purposes for various districts in the Kern River field. The gas will be manufactured from oil by the Lowe process. It is stated that the cost will be very small, as the Company will own their wells, and the natural gas in the field will be made use of. The average price of coal gas in San Francisco is at present $1·35 per 1000 cubic feet.

Darlington Water Supply.—A Local Government Board inquiry is to be held at Darlington on the 22nd inst., with reference to the application by the Town Council for a Provisional Order to amend the Darlington Extension and Improvement Act, 1872, so as to enable the Corporation to borrow further moneys for the purposes of their water undertaking. The Board have intimated that two Inspectors will be sent down, in view of the fact that the application is of an exceptional character, seeking as it does to alter an Act of Parliament.

Norwich Water Company.—The half-yearly general meeting of the City of Norwich Water-Works Company was held a few days ago at the Company's offices in Norwich—Mr. W. Cadge in the chair. The Secretary read the balance-sheet to Sept. 29, 1901, which was laid on the table for the inspection of the shareholders, and also the report of the Directors. It was stated in the latter that, after payment of the working expenses, debenture interest, and the dividend on the preference shares, and including the balance from the previous half year, there remained a sufficient sum to pay a dividend on the ordinary shares at the rate of 6 per cent. per annum (deducting income-tax); leaving £10,889 to be carried forward. The Directors had therefore declared a dividend at this rate. The report was adopted.

Oldham Water Supply.—In view of the fact that the Oldham Electricity Committee will require a large supply of water for their new generating station at Greenhill, and that this demand would seriously interfere with the supply to other consumers, the General Manager (Mr. Arthur Andrew) has suggested that a special main should be laid from Strinesdale upper reservoir for the conveyance of water to be used for manufacturing purposes only; and that the reservoir in question be solely utilized for storing water from the gathering grounds at Strinesdale and Besom Hill, which now runs to waste. The area of these gathering grounds is 1010 acres; and reckoning only 15 inches rainfall yearly as being available, a total annual quantity of 340 million gallons would be furnished. Altogether it would not be difficult to supply 200 million gallons a year for an outlay of not exceeding £20,000, or equal to 1½ per 1000 gallons.

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St. Helens Municipal Undertakings.—It is stated in the St. Helens Corporation Year Book, just issued, that the output from the gas-works in 1890 was 186,973,300 cubic feet; while last year it was 340,656,020 feet. The total capital expenditure on the undertaking up to March 31 last was £274,499. The electricity undertaking has shown considerable progress. In 1898, the number of units sold to private consumers was 35,758, against 260,404 in 1901; the increase in the number of lamps connected being from 4550 to 21,229.

A public meeting of owners and ratepayers at Margate has decided against the promotion of the Bill in Parliament for securing additional water-works at Wingham. A poll has been demanded.

At an extraordinary general meeting of the Monte Video Gas Company, Limited, to be held on the 16th inst., the Directors will ask for authority to create and issue perpetual first mortgage debenture stock bearing interest at a rate not exceeding 5 per cent. per annum, to replace the £58,080 of 5 per cent. debentures which have been paid off, or are to be during the next four years.

The Horsforth District Council have decided to extend the works which they recently purchased from the Horsforth Water Company, and have instructed their Engineer (Mr. E. J. Silcock) to prepare plans and specifications of a new well and borehole, with the necessary pumping machinery, to carry out the recommendations of a report which he recently made to the Council.

An explosion occurred on Thursday last at the Carlisle Gas-Works, by which a man named Alexander Cully was seriously injured. It is supposed he had been sounding the ammonia liquor well, when an explosion suddenly took place. The top of the well was blown to atoms; and Culley had an almost miraculous escape from sudden death. He was, however, much burnt, and was removed to the Cumberland Infirmary, where he is progressing favourably.

The Saddleworth Lighting Committee are seeking advice from Mossley. During the past winter, incandescent gas lighting has been pretty generally adopted in the district. The result has been highly satisfactory so far as light is concerned; but every storm has played sad havoc with the mantles. At a recent meeting of the Committee it was reported that they had it from Mossley that when a storm was brewing they used cheap mantles there. The information wanted is—"How do the Mossley lighters know when a storm is coming on?"

An inquiry will be opened at the Guildhall, either to-day or to-morrow, by Mr. A. P. Trotter, the Electrical Adviser to the Board of Trade, into the causes of the explosions which recently took place in Newgate Street and Old Bailey, as reported in the "JOURNAL" last Tuesday, in connection with cables owned by the City of London Electric Lighting Company and the Charing Cross and Strand Electricity Supply Corporation. It is stated that the explosions were not due to coal gas, but to the heated bitumen in which the cables are laid.

Messrs. Kirkham, Hulett, and Chandler, Limited, have received an order from the Maidenhead Gas Company for one of their patent "Standard" washer-scrubbers for 750,000 cubic feet of gas per 24 hours.

Messrs. J. Firth Blakeley and Co., of Thornhill, Dewsbury, are showing considerable enterprise in cultivating their business. In addition to what they have done in creating a ready channel for the transfer of second-hand gas plant, they have extended their operations into the manufacture of new apparatus; and our attention has been directed to examples of the work they have recently done in this particular direction. They have completed a contract at the Portland (Dorset) Gas-Works. It included four 12 feet square purifiers, new combined steam-engine and gas-exhauster, rotary scrubber-washer, together with a set of their patent rectangular condensers, fitted with water-washing arrangement in the latter two columns. This is an invention which we illustrated and described in the "JOURNAL" for Jan. 10, 1899. The condensers provide a large surface in contact with the gas; and by constantly changing the direction of the flow, and breaking up the gas by means of intercepting baffle-plates, the body of gas is split up, and so the deposit of the heavier compounds is aided—more so, we are told, than is the case with the ordinary pipe or annular condensers. The firm have a similar set in hand for the Bentham Gas Company. They have also recently completed, for the Boroughbridge Gas Company, a cast-iron tank, 41 ft. 6 in. in diameter, (including the excavating and concrete work), and a gasholder 40 feet diameter, with all new sheeting. Other lately finished work comprises: Four beds of retort-settings for Mildenhall (Suffolk) and Kingscliffe, near Peterborough, including all the necessary ironwork, &c., at the latter works, with condensers, scrubbers and purifiers, and increasing the yard connections to 6 inches throughout. At Wollaston, near Wellingborough, the entire works have been practically remodelled; the extensions comprising retort ironwork, hydraulic and foul mains, annular condensers, exhauster and gas-engine, scrubber, purifiers, and governer. A 50 feet diameter gasholder for the same Company is now being constructed. At the gas-works of the Meltham District Council (near Huddersfield), they have recently coupled up and started to work, new gas-engine and exhauster, scrubber-washer, condensers, &c., equal to dealing with upwards of 250,000 cubic feet of gas per day. Purifiers have been put down by them at Olney, Biggleswade, and Hengoed, Caerphilly; and at the last-named place, two scrubbers and combined engines and gas-exhausters have been supplied. Among new apparatus, Messrs. Blakeley and Co. are making Cripps's patent washers and tar extractors, of which several may be seen in operation at their works. Where so much energy is displayed in the building up of a business as is disclosed here, success is almost sure to follow. One of the latest orders secured by the firm is for two beds of retorts (a six and a four), on Yuill's regenerative system, for the Chipping Norton Gas Company.

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